October 2011

An Analysis of First-Year Registration at WPI

Craig Alan DeMello
Worcester Polytechnic Institute

Erica Jane Norton
Worcester Polytechnic Institute

Victoria J. Brown
Worcester Polytechnic Institute

An Analysis of First-Year Registration at WPI

Interactive Qualifying Project completed in partial fulfillment
of the Bachelor of Science degree at
Worcester Polytechnic Institute, Worcester, MA

Submitted by:

_____
Victoria Brown

_____
Craig DeMello

_____
Erica Norton

October 23, 2011

In Cooperation With
Heather Jackson, Worcester Polytechnic Institute, Registrar

_____
Professor Arthur C. Heinricher

Abstract

This report is an analysis of student interactions with the course registration system at WPI with a focus on the waitlist process. We identified student ignorance, poor communication, and a lack of personal responsibility as three related causes for unnecessary waitlists and student frustration. Simple intervention such as peer advising and a scheduling tool, were able to help first year students, and reduce the number on waitlists by 50% for this group.

Authorship Page

Section	Author
Procedure	Victoria
Background	Erica and Victoria
Introduction	Craig
Methodology	Everyone
Results	Craig
Discussion	Craig
Conclusion	Erica
Recommendations	Everyone
Appendices	Everyone

Table of Contents

Executive Summary

We observed the course registration process for first year students on the residence hall floors during registration in November 2010 as they registered for their C and D term classes. WPI is unusual in that students register for several terms at once, unlike most institutions where students only register for one semester at a time. This adds a great deal of complexity to the decision process. For example, in C term of 2011 there were 9 Calculus III sections, 9 History options, and 12 Physics 1 sections creating 972 possible schedules for a student interested in these courses. If this same student progressed to Calculus IV (9 sections), Physics 2 (12 sections), and another History course (10 sections), there are another 1,080 combinations for D 2011, giving a grand total of 1,049,760 different schedules for two terms.

While observing the students during scheduling, we offered several suggestions to the students who found themselves waitlisted for sections and helped them find schedules that worked. We also conducted follow up interviews in the spring to determine students' progress regarding their schedules. We also conducted an identical interview with 23 first year students who did not receive our help in November.

After our initial observations of the 58 students, half of the students we helped were moved off of waitlists immediately. The solutions were usually simple. (In some cases, the solution required registering for a class before 11:00am and the student preferred to remain on the waitlist.) There was also a clear difference in the number of waitlists between those students we helped and those we did not.

Some waitlist issues can be attributed to simple lack effort by the students. For example, of the 58 students observed in November, only one had created alternate schedule options before

logging into the registration system. One recommendation is that WPI support a software tool that would make it easier for students to explore scheduling options.

Several changes can be made to improve the process and the student experience, thus reducing the number of waitlists and student complaints. These changes include:

- Using a scheduling tool to find course combinations (like the WPI Scheduler[*]);
- Re-ordering the sections so that open sections appear at the top of the list;
- Improve the user interface for the web registration system.

WPI has many majors that are have schedules with courses only offered in particular terms, so it is important for students to get the classes they desire when they want and need them. It is unlikely that students will begin to put forth more effort to make schedules; so it makes sense to reduce the effort required. Reducing student frustration not only helps students, but it can also reduce the amount of effort dedicated by WPI staff to fixing schedules and dealing with student complaints, thus reducing administrative costs to the school.

One additional challenge for the registration system is in communication between the registrar's office and undergraduates. Students tend to ignore official emails because the important messages are lost in the flood of announcements and emails which are not important to students. The important messages are lost in the email storm. We describe a procedure that allows students to forward emails from certain offices (such as the Registrar) to the students phone as a text message.

[*] Hawkins, C. A., Lucia, P. N., & Rubio, G. (2008). *The WPI Scheduler Project.* Worcester: Worcester Polytechnic Institute.

Chapter 1: Introduction

More students are enrolling in college as higher education becomes increasingly important to be successful. The greater number of university students has caused need for more sections of courses in order to help students get into the courses they need to achieve their degree. While these issues get resolved by the universities, students add their own registration problems by ignoring information sent out in emails by the school. Important emails are ignored while students social media websites and other methods for regular communication. Worcester Polytechnic Institute has several issues with its current registration system, some caused by communication issues, but others caused by the way technology is used to manage the process.

WPI is different from many universities in several ways. One of the main differences is that the academic year has four seven-week terms instead of only two semesters. Students are required to register for more than one term at each registration session, which makes for more combinations of schedules and greater opportunity for frustration. Students are also allowed to take their classes in any order with no enforced prerequisites and only guidelines and recommend background. These factors, combined with the daunting task of adjusting to college can be overwhelming for first-year students. Indeed, the majority of issues concerning waitlists come from first year students.

To fully understand the problem from both the students' and the school's point of view, we interviewed staff members to determine the issues faced and to understand how the scheduling and registration system works. We observed first year students during course registration in November, 2011 in order to identify the issues faced during registration, and offered some advice based on our own experience. In the following January, we met with the students we had assisted and determined how their schedules changed. We then compared the

survey results for these students with another group of first year students to measure the impact of our intervention.

The differences between WPI and the typical college create problems specific to WPI. The seven-week terms provide flexibility in scheduling but also make scheduling more complicated. Even though there are no required courses and no official prerequisites, students still need to plan carefully in order to register for the classes they need when they are offered. In addition, students register for four terms at one time (after the first year, when they register for two terms at a time). Some courses, especially first-year courses, have many sections and many variations of the same schedule are often overlooked. The humanities and arts requirement also causes complications, because the classes are typically small and a large number of students desire specific classes. When a course is filled to its limit, students can add themselves to a waitlist for the course in the hope that either someone will drop and so a seat becomes available or that WPI will add sections and increase the capacity to satisfy student demand.

Students at WPI face several issues other than the complicated schedule. The communication between the Registrar's Office and students can sometimes be confusing, especially when students do not take the time to thoroughly read the email. The web information system (also referred to as Banner of Bannerweb) can also make the registration process more confusing and stressful. We will describe the process in registration process in detail in the next section, but there are many places where it is easy to make an error and simple errors can have serious consequences.

During this project, we investigated the registration process and focused in particular on the waitlist system. We identified many problems and found that many of these problems could be solved easily and with little or no cost to the students or WPI. Some problems, such as

students not reading e-mails or students refusing to register for classes before 11:00am, are more difficult to solve. These are people, not structural, problems.

One way of solving the communication issue would be to use a feature in Outlook which allows students to forward emails from specific sources to their cell phone as a text message. We have constructed guide (see section 2.2.5) that would lead the students through the process. Students on waitlists would be sure to receive, and be able to respond to, the message from the registrar when a seat on a waitlisted course becomes available.

To summarize, we found that first year students had difficulty navigating the web registration system, they did not (or did not find it easy to) explore alternate schedules and often chose to stay on a waitlist when other options were available, and communication between the Registrar's Office and students makes the later resolution of waitlisted schedules difficult.

Chapter 2: Background

2.1 History of Course Registration for First Year Students

First-year students register for their first two term classes during the summer before they arrive at WPI. In November of their first year, they register for their third and fourth terms. Later in their first year, near the first week of April, students will register again for courses, but this time for all four terms of the following year. Depending on the student's major and the number of sections offered for each course, there can be anywhere from one to over a million possible schedules.

Students will typically register for courses five times during their time as an undergraduate. This registration process has evolved over the years. In the 1970's, students filled out paper registration forms while waiting in line in Harrington Auditorium. Alumni[†] describe spending hours waiting in lines for each course until they were registered for all of them. For high demand courses, they said that some students would get to the front of the line, only to discover that the course was full and would then have to find a new course.

The process was changed greatly by the introduction of computerized registration. Initially, it was a tool used by the registrar's office. As the technology improved, students eventually had direct access to the registration system on line and were register for courses from their residence hall. This freedom eliminated the hours of waiting in Harrington, and turned the waiting into a waitlist format that is what we use today.

WPI has used the Banner database management system for more than 20 years. Once Banner web was created, Worcester Polytechnic Institute became a beta tester for the product and eventually designated it as the official system to hold course registration information. Since

[†] Wally Towner and Charles Crathern were interviewed in fall 2011.

Banner web was made for institutions that had a semester system for courses rather than a term system, Information Technology staff made adjustments to Banner to fit the institution's needs.

In April of each year, first, second and third year students register for all four of the upcoming year's terms. Each class year registers for courses on a different day. On the first night of registration, the rising seniors log onto Banner and are allowed to register starting at 9:00pm. The next day, the rising juniors are able to register and at the same time (9pm). The day after that, the rising sophomores are allowed to register for courses. All students may continue to register or change courses until the first of May. After course registration closes for upperclassmen, the incoming first year students begin to register. In mid-July, once the incoming first year students have finished choosing classes, registration re-opens for returning students.

Approximately two weeks before registration opens for students, a list of courses and scheduled times are posted online at the Registrar's website and students may use this information to create a schedule of their desired courses. To prepare for registration, students need to find the Course Registration Number (CRN) for each course on their schedule. On the night of registration, the majority of each class will log onto Bannerweb to register.

When registration opens, students navigate through the Banner website to the registration page and select which semester to register. After choosing the semester, the student will then enter the Add/Drop page and may type the CRNs for their courses into the textboxes. After all of the CRNs are added, the student will click the "Register" icon to register for those courses associated with the CRNs added. Popular courses can fill within minutes so it is necessary that students complete this process as quickly as possible. The website will then show the student the courses for which they are registered and/or waitlisted. Students who have not prepared in advance often find themselves on waitlists and/or trying to find alternate courses (and CRNs) as

quickly as they possibly can. If the student is waitlisted for a course, they must choose to either drop the course or be added to the waitlist. Once the student is done registering for that semester (two terms), they must return to the page where they can choose another semester to finish their registration for the rest of the year (other two terms); the student completes the same sequence of steps for the second semester.

A flow chart of the course registration process is shown in Figure 1.

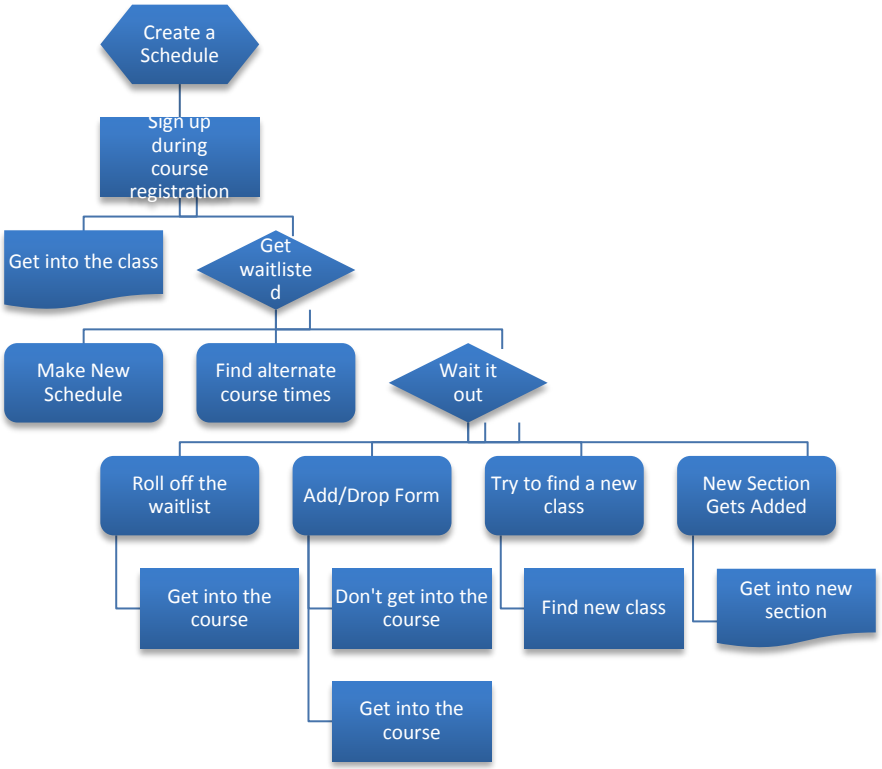


Figure 1: Course Registration Flow Chart

First year students have a slightly different experience with course registration because they register twice in their first year. In November, first year students register for their spring semester courses. First year students also have access to resources not available to upperclass students. During this course registration period, students may have both a Resident Advisor (RA) and a Community Advisor (CA) in addition to their Faculty Advisor to help them design and register for a schedule. This is the Insight Team, but the Insight Program ends in December

for first year students. In the spring, the first year students register for their sophomore year courses, but must do so more independently because they do not have access to a Community Advisor and meetings with their (probably new) Faculty Advisor occur off the residence hall floor.

Once the school year has ended, course registration opens to incoming first year students, who are then able to begin making their schedule. Many incoming students, who typically enroll at WPI as high school seniors, do not have experience with creating a course schedule. The Academic Advising Office has developed a website known as *Designs*[‡] (Worcester Polytechnic Institute, 2011). *Designs* considers a student's major and high school background, and then it provides suggestions about which classes would be most useful towards the student's degree requirements.

There are other kinds of advising support for rising upperclassmen. Several academic departments offer tracking sheets to their students, while other departments' academic advisors have their own standard tracking sheet they offer to their students. Regardless of the department, the process for determining needed courses and degree requirements can be stressful. During selection process, several rising upperclassmen were noted by our group on popular social media networks such as Facebook making statements such as:

> *"You can't move on to sophomore year until you can show proficiency with the WPI registration system!"*

and

> *"I'm waitlisted for two... and by two I mean 5..."*

This project provides an overview of the student experience during the course registration process. The following are student views of the registration tools within the Web Information

[‡] Designs website: http://www.wpi.edu/Admin/OAA/Designs

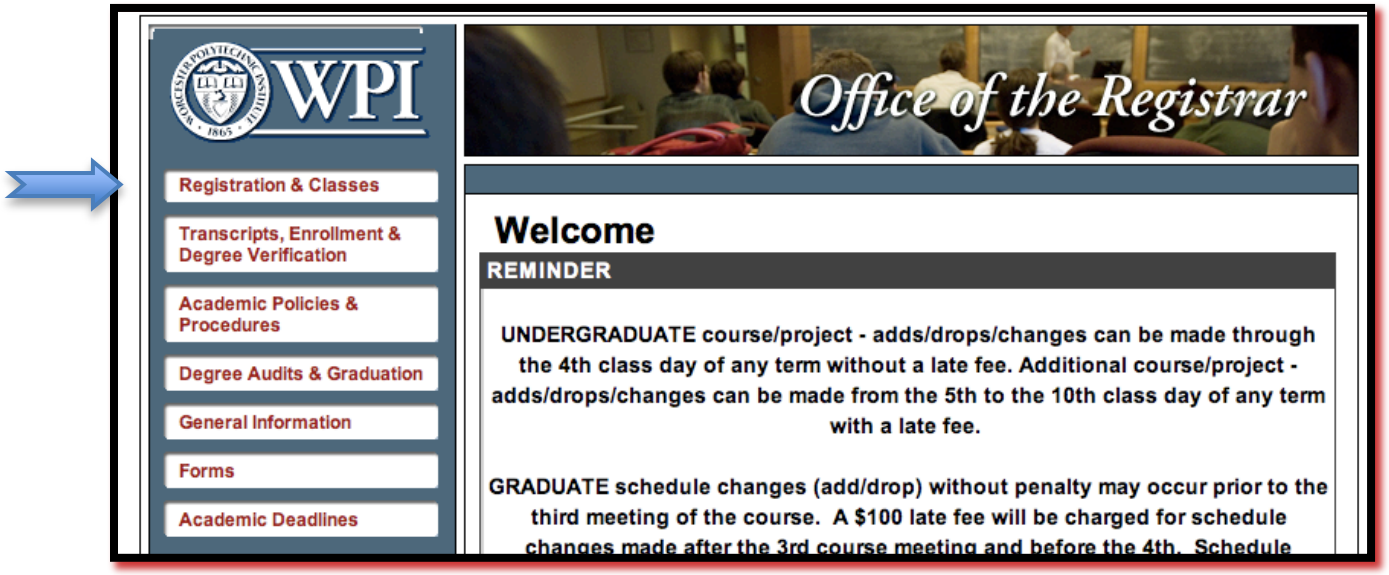
System (Bannerweb), the WPI Scheduler, and a tool that students can use to converting Registrar emails into text messages.

2.2 Current Procedures for Course Registration

The following sections examine student experience with the registration process. The process for making a schedule using the tools the registrar provides will be laid out. The procedure for signing up for the classes that were selected on the registrar's website will also be shown. This second step uses the Bannerweb data information system.

2.2.1 How to Find Courses Using the Registrar's Website[§]

1) Go to the website for the Office of the Registar at http://www.wpi.edu/Admin/Registrar/ .
2) Select"Registration & Classes" from the left menu.

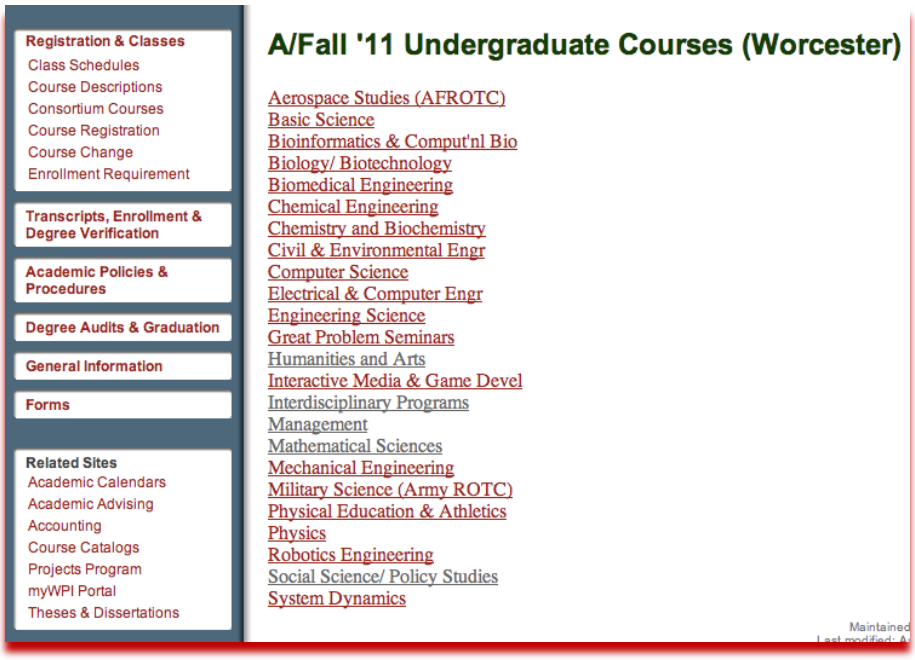


[§] Disclaimer – While there are MANY different ways to make a schedule, this report is highlighting a "standard" approach.

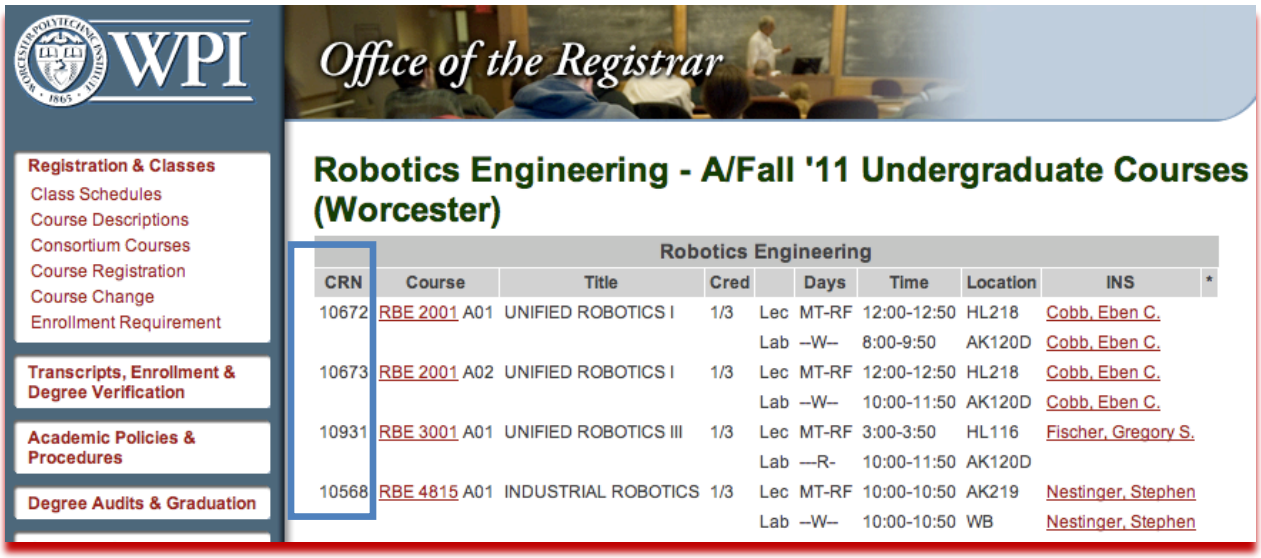
3) Select “Class Schedules” from the options.

4) Select the Term for which you would like to find courses.

5) Select the department for which you would like to choose courses.



6) Select the courses you want, and check the times to make sure that they do not overlap.

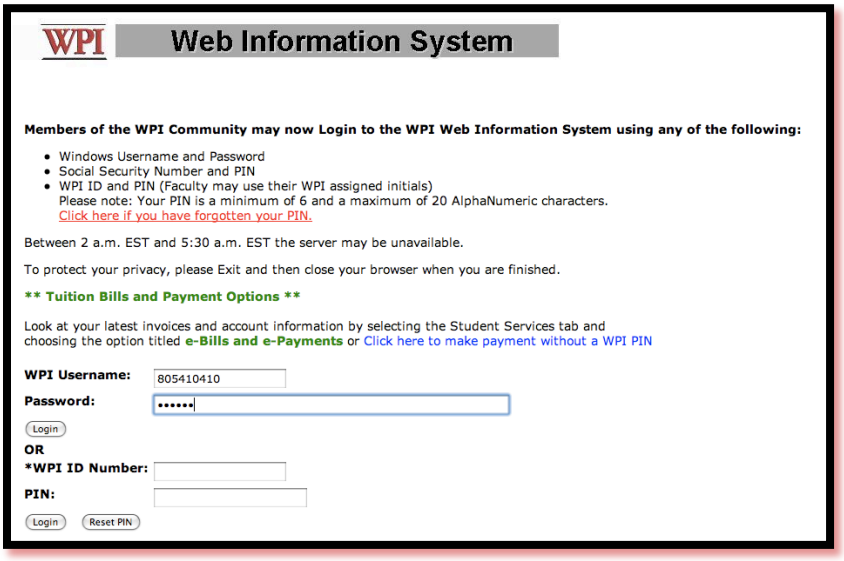


7) Record the "CRN" or Course Registration Number.

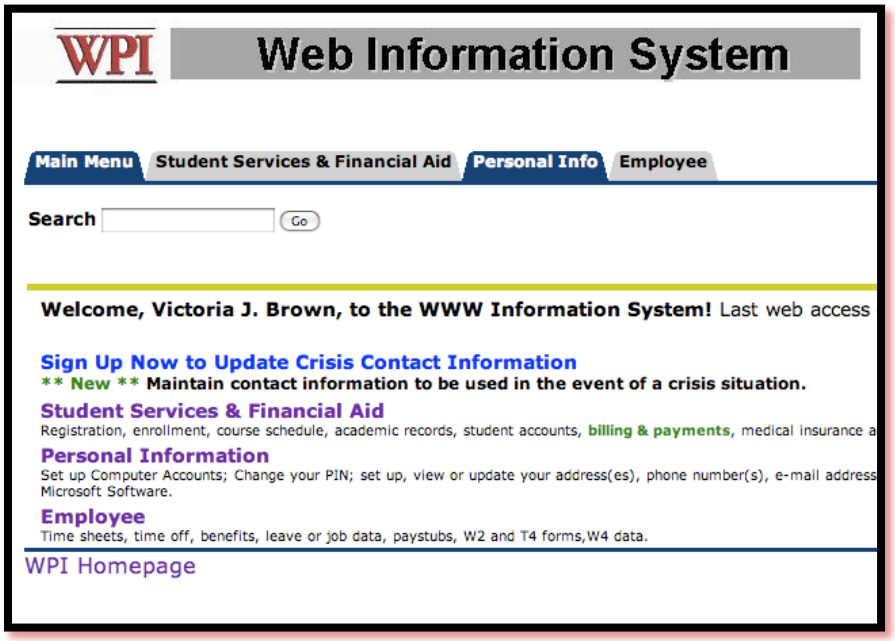
8) Repeat the above steps until you have a full schedule for all four terms.

2.2.2 How to Register for Classes

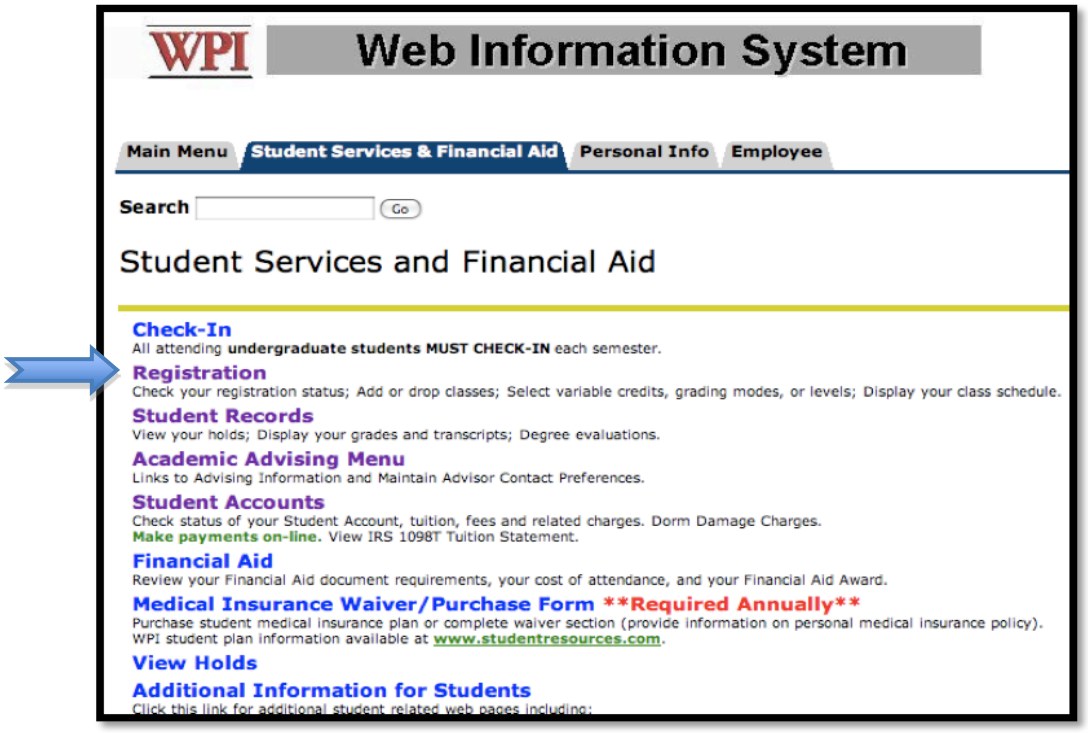
1) Sign into Banner: Standard ID # and password entry at bannerweb.wpi.edu. (Note that we have entered our ID number in the Username field and will receive an error.)



2) Select "Student Service & Financial Aid" tab from top menu options.



3) Select “Registration” from the Menu options.



The next step will depend on whether or not you wrote down the Course Registration Numbers (CRN) when you were visiting the Registrar’s website to create your schedule.

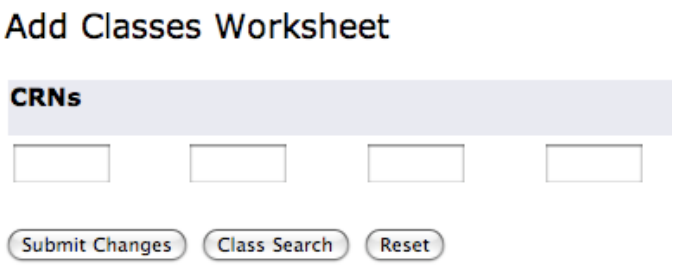
A. If you DID record the CRN’s of the courses you wanted previously, you will continue with steps 4-6.

B. If you DID NOT record the specific CRN’s for your selections or are trying to fill an open slot, you will follow steps 7-10.

4) Select “Add / Drop Classes”.

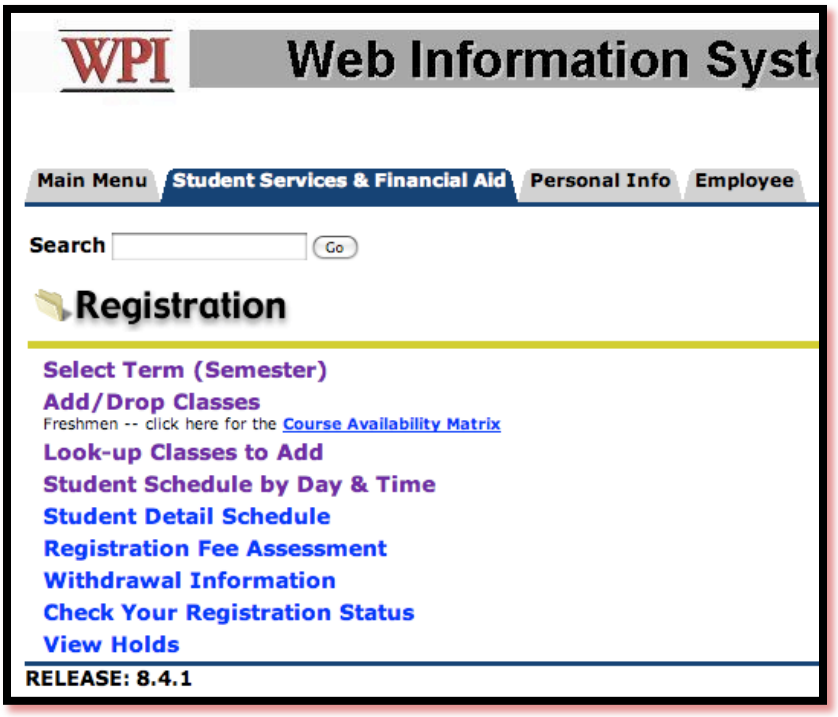
5) Select the semester for which you would like to register.

6) Enter the CRNs for the courses you want into the white boxes, and submit.

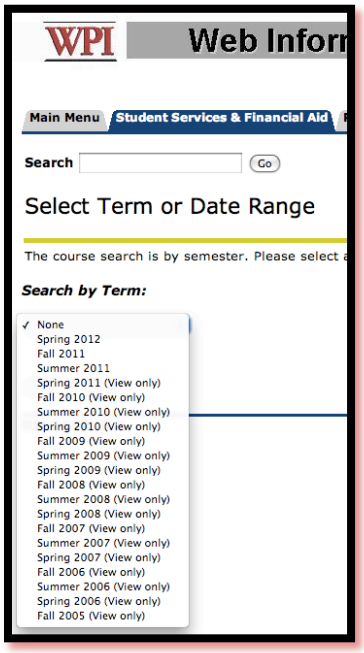


If you are really lucky, you now have a complete schedule and can go back to playing your massively multiplayer online role-playing game (MMORPG) or, as we would recommend, reviewing books on writing style and standards for undergraduate research reports.

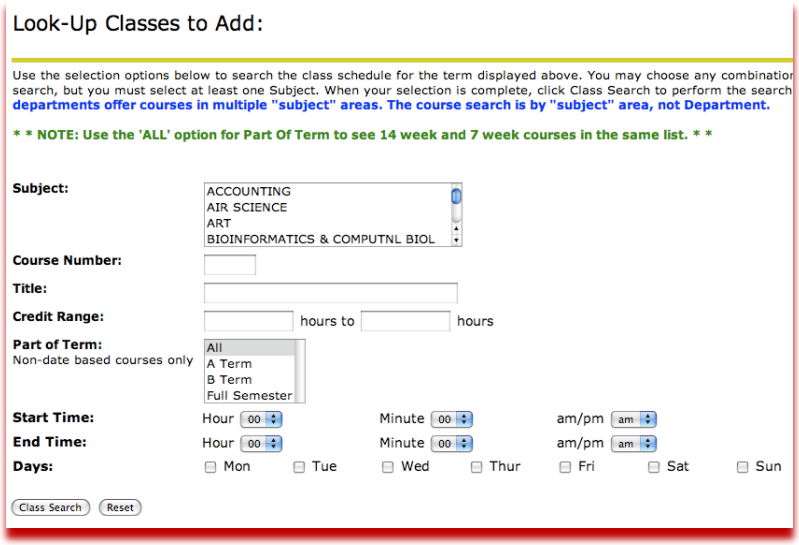
7) Select “Look Up Classes to Add” from options.



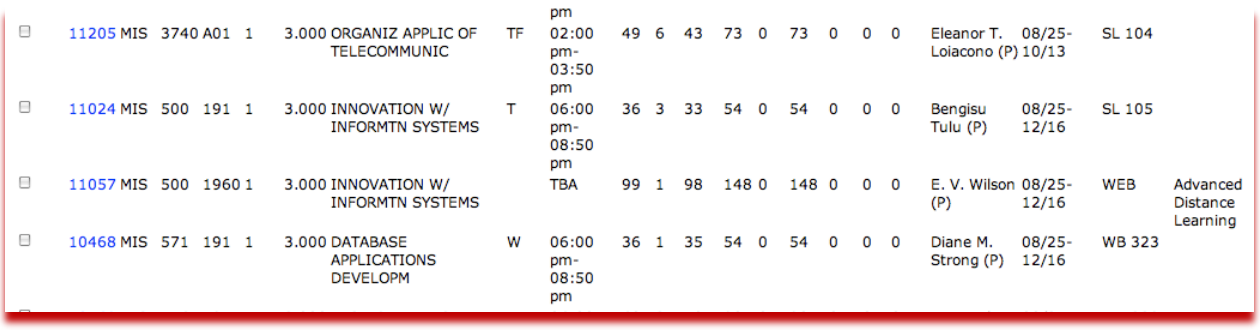
8) Select the semester in which you would like to search.



8) Fill in the subject and any other specifying information.



9) Select the courses you want by selecting the checkbox on the leftmost column, and submit.

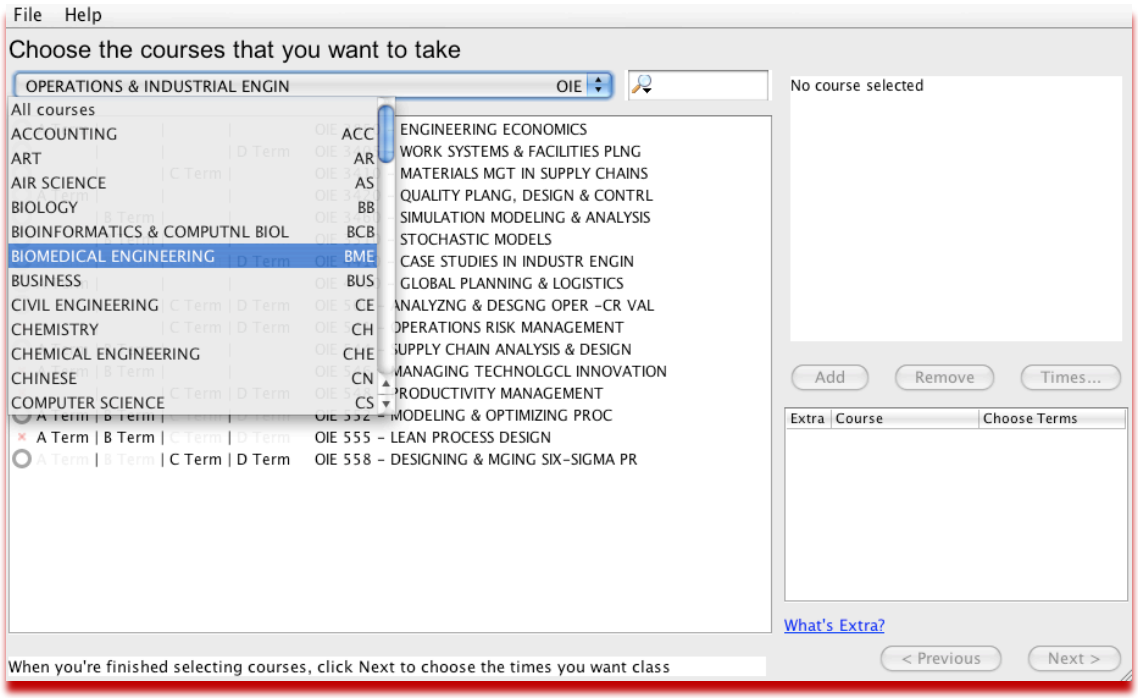


☐	11205	MIS	3740	A01	1	3.000	ORGANIZ APPLIC OF TELECOMMUNIC	TF	02:00 pm-03:50 pm	49	6	43	73	0	73	0	0	0	Eleanor T. Loiacono (P)	08/25-10/13	SL 104	
☐	11024	MIS	500	191	1	3.000	INNOVATION W/ INFORMTN SYSTEMS	T	06:00 pm-08:50 pm	36	3	33	54	0	54	0	0	0	Bengisu Tulu (P)	08/25-12/16	SL 105	
☐	11057	MIS	500	1960	1	3.000	INNOVATION W/ INFORMTN SYSTEMS		TBA	99	1	98	148	0	148	0	0	0	E. V. Wilson (P)	08/25-12/16	WEB	Advanced Distance Learning
☐	10468	MIS	571	191	1	3.000	DATABASE APPLICATIONS DEVELOPM	W	06:00 pm-08:50 pm	36	1	35	54	0	54	0	0	0	Diane M. Strong (P)	08/25-12/16	WB 323	

2.2.3 How to Make a Schedule Using the WPI Scheduler

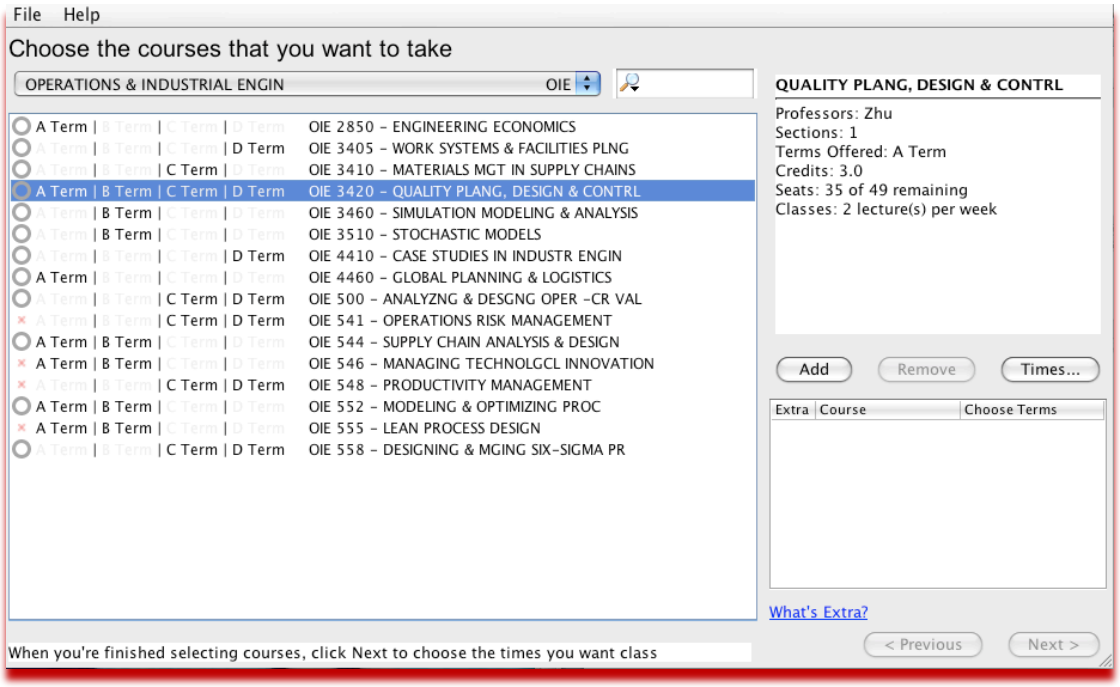
As was previously mentioned in the Introduction, the WPI scheduler[**] is a tool created by an IQP group designed to make registration and creation of course schedules easier and faster for WPI students. They have continued to support the tool since leaving WPI, without support or participation from the Information Technology Department at WPI. The Scheduler is hosted on a server in California and the IQP students continue maintain the tool and answer student questions.

1) Open the WPI Scheduler program from the email sent by the registrar approximately two weeks before registration. (It is available on the web at http://www.wpischeduler.org/)
2) Select the department you want to find a course in.

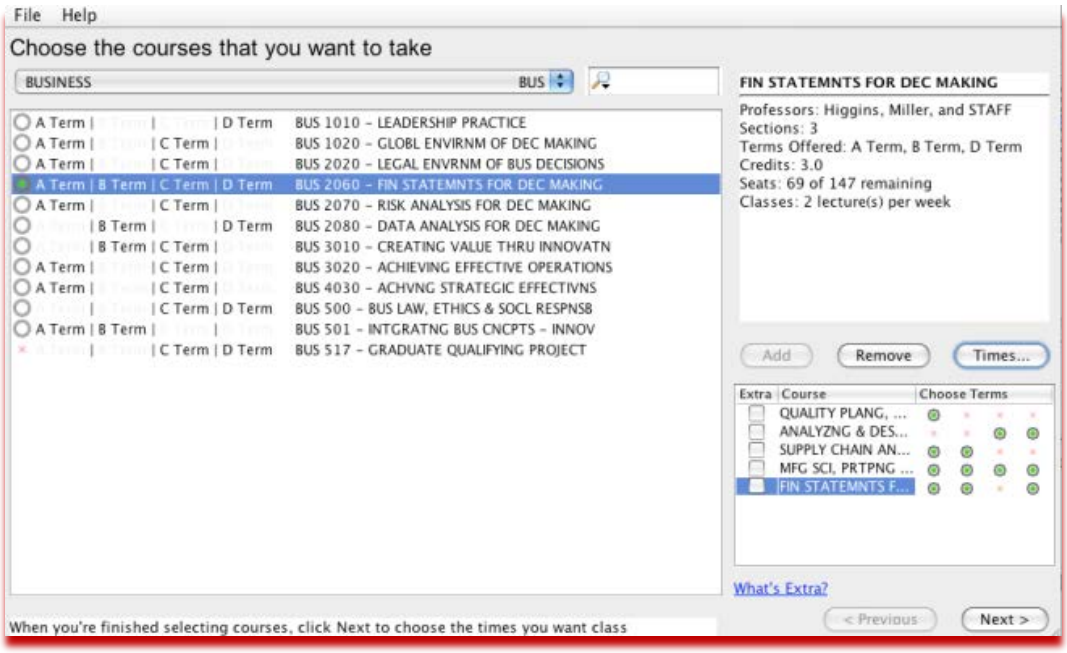


[**] Hawkins, C. A., Lucia, P. N., & Rubio, G. (2008). *The WPI Scheduler Project.* Worcester: Worcester Polytechnic Institute. The Scheduler is currently located on the web at http://www.wpischeduler.org/

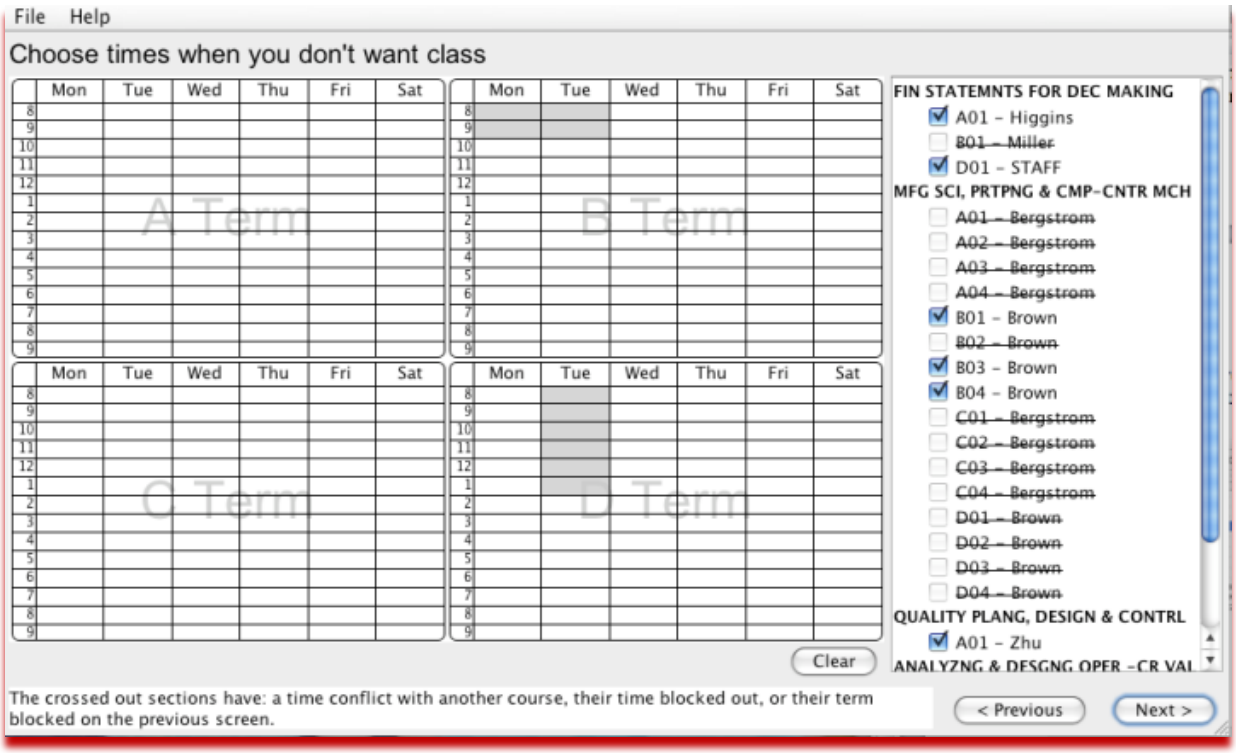
3) Select the course you want, and check for open seats in the upper right hand box. If there are open seats, select the "Add" button below the box.



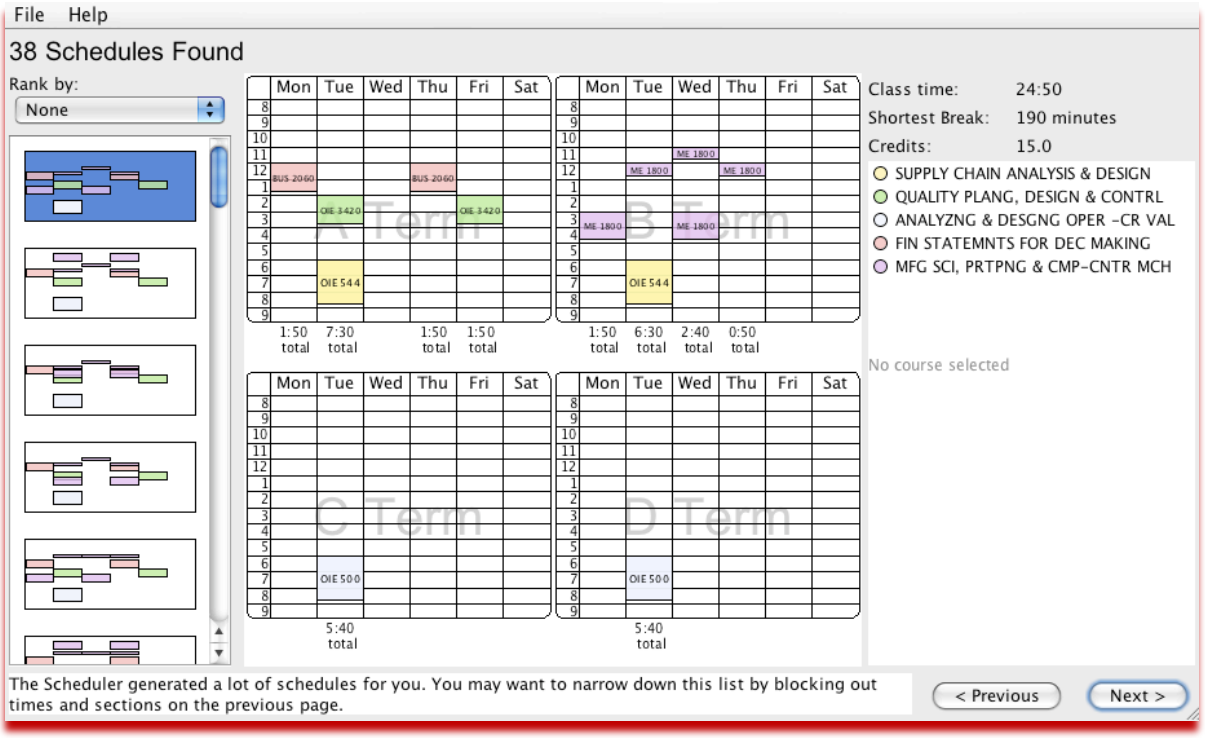
4) For courses that are offered more than one term, deselect the terms when you don't want the course by clicking on the corresponding green dot.



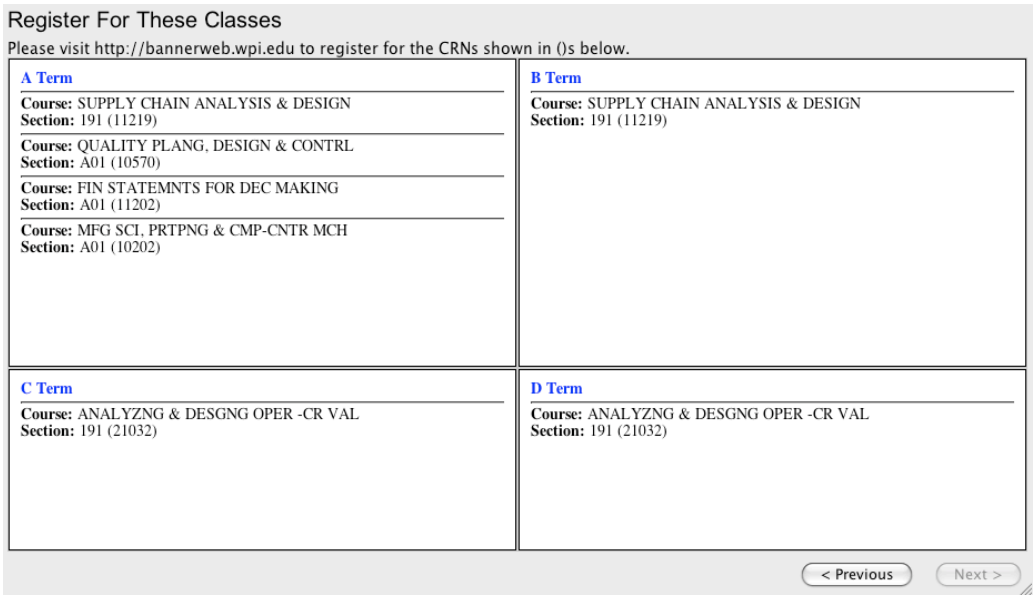
5) Color in the corresponding areas of the chart at the times in which you do not want to have class. Reasons for using this page might include a job or meetings.



6) On the following page, you will find a visual representation of your schedule possibilities. In order to look at all the different schedule possibilities, use the scroll bar on the left hand side of the screen. Once you find a schedule you like, click “Next”.



7) On the following page you will find all of the CRN's of the classes you want. Record this somewhere for later use. The "save" button DOES NOT WORK.

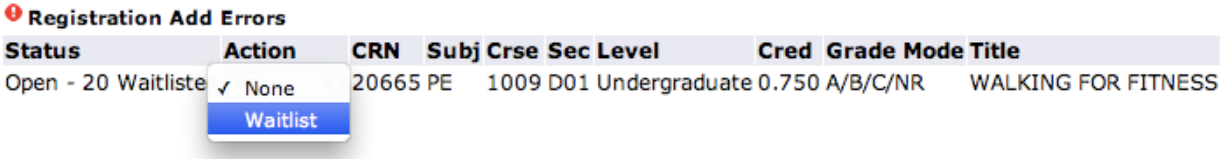


2.2.4 How to Waitlist Yourself for a Course

During course registration, sometimes students find themselves trying to register for a course that is already full. When this happens, they are offered the opportunity to waitlist themselves for this course, or look at something else. Below is the standard procedure an undergraduate student encounters when this happens.

1) In the event that you have a wait listing error during registration, there are two courses of action you may take.

   A) Waitlist Yourself by the drop down menu.



   B) Drop the course and take no action.

2) If you choose to waitlist yourself, please note that the number "20" next to the word "Waitlisted" refers to your initial position on the waitlist. You will not see this number again after you submit.

2.2.5 Getting Off of a Waitlist and into a Course

Each year, course schedules are published at the end of March. Students then have approximately two weeks to meet with their advisors and work out a schedule that fits their desires and the needs of their degree requirements. On course registration day, students typically rush to register when Bannerweb opens. Within minutes, core courses required for all majors are full, and waitlists begin to form. Once a class has a waitlist, the student is informed and is given the option of being added to it. When a student elects to be placed on the waitlist, they are informed of the seat number; however, the student cannot access the waitlist seat number after this initial time.

When there is a waitlist for a class, students have a few options. First, the student can stay on the waitlist and see if they can get a seat when and if one becomes available. This is a likely preference if the initial waitlist seat number is low or if there is a long period of time before the start of the course. For immediate results, students may remake their course schedule, trying to avoid other waitlists that may have formed in the time that has passed since the initial registration.

For those students who decide to stay on the waitlist, a few different things can happen. First, a seat may become available in the course section. Second, a student may find a different course that sounds more interesting and enroll in that course instead. In some cases, if the waitlist is large enough, the university opens another section. When this happens, waitlisted students are notified of the new section and are given instructions for how they may switch into it. Finally, a student can attend the first meeting of a class with an add/drop slip hoping that the instructor is capable of and willing to accept more students into the course; this is a common option for seniors who need the course in order to graduate.

If a student chooses to stay on the waitlist, they will receive an email notification from the registrar if a seat has opened. In this email, the student is given the option of accepting the open seat by responding to the email. This email does not specify course, so it can cause confusion if a student is waiting on more than one waitlist.

The email from the registrar gives students a 48-hour window to accept or decline the seat. If a student does not respond to the waitlist email in time, they will lose the opportunity to accept the seat and is removed from the waitlist entirely. For many students, registration happens in April, and they will most likely receive an email during the summer about claiming an open seat for A term courses. This can be problematic because many students do not always check their email frequently during break, and some are on vacations where they do not have access to e-mail.

Issues with email communication could potentially be negated if students forwarded these registrar emails to their phones in the form of a text. However, many students do not realize that Outlook allows users to forward emails from specific email addresses directly to text message. By raising awareness of this functionality, students could more easily find out if they have been taken off the waitlist without having to worry about having constant internet access.

The following directions can guide a student through the process of setting up text notifications in order to avoid missing emails when away from internet for periods of time greater than the 48 hour window.

Texting Notification

To receive additional notification about an open seat in a class via texting please use the following instructions:

1) Log on to the Microsoft Outlook email service through the WPI website.

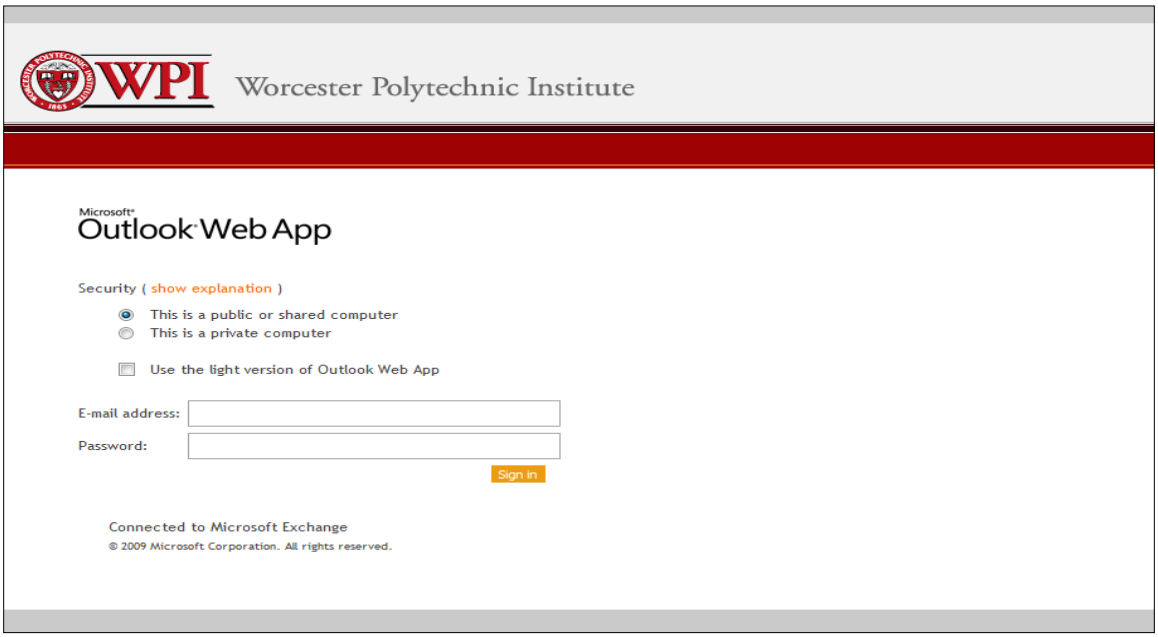


Figure 2

2) Once logged into Outlook, click the **Options** link that is located at the top right of the screen.

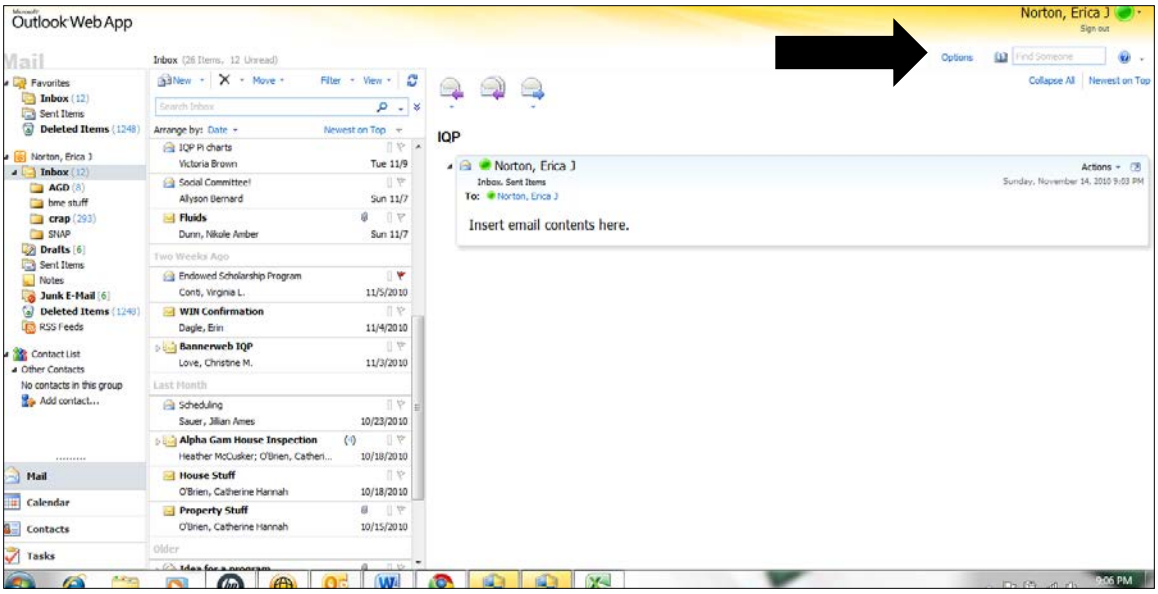


Figure 3

3) Click on the Phone option once inside the Options page.

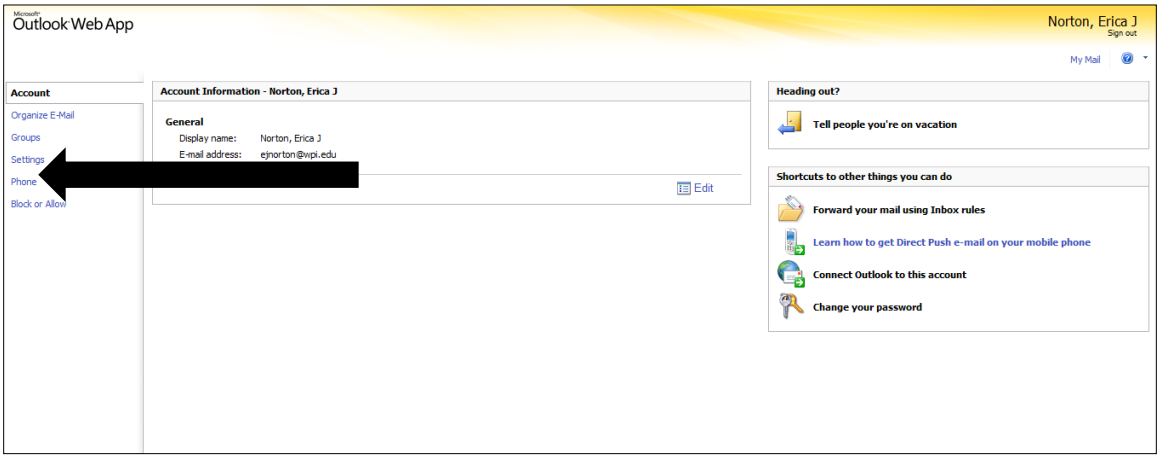


Figure 4

4) Choose the Text Messaging tab at the top of the screen.

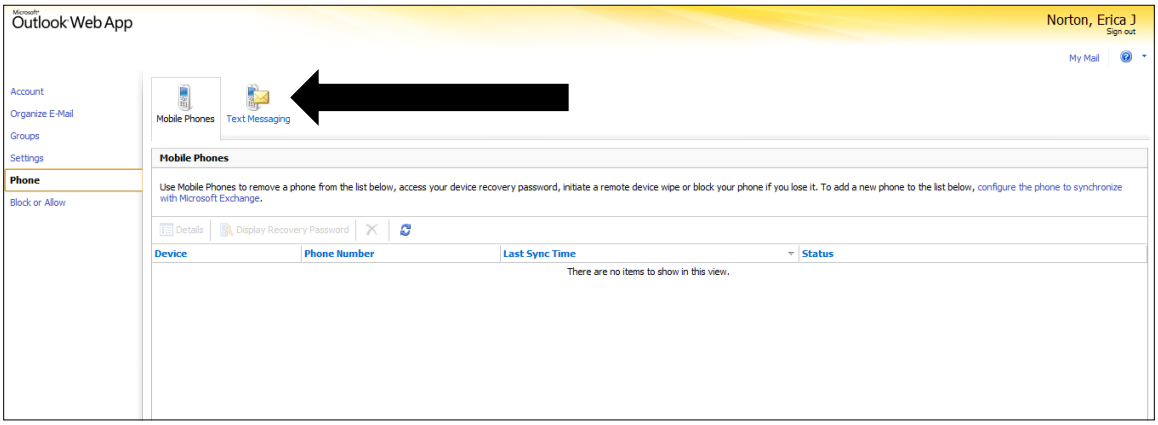


Figure 5

5) In order to allow text messages to be sent to a mobile device, click Turn On Notifications… .

Figure 6

6) Once this has been selected, a pop up screen will appear and will ask for the locale and the mobile operator associated with the phone. After imputing the information click Next.

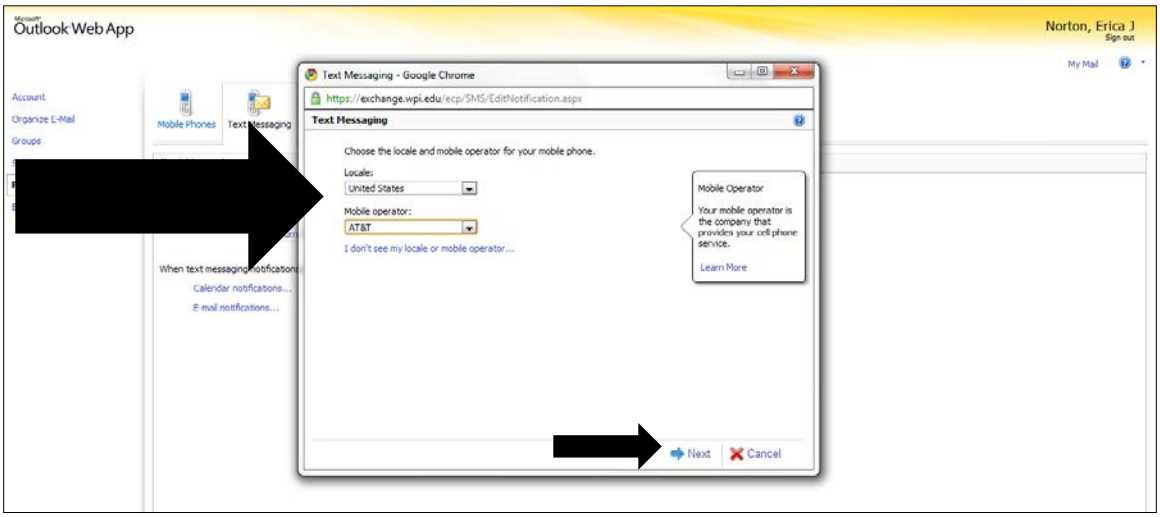


Figure 7

7) Input the cell phone number in which a notification will be sent to. Once this is done, click Next.

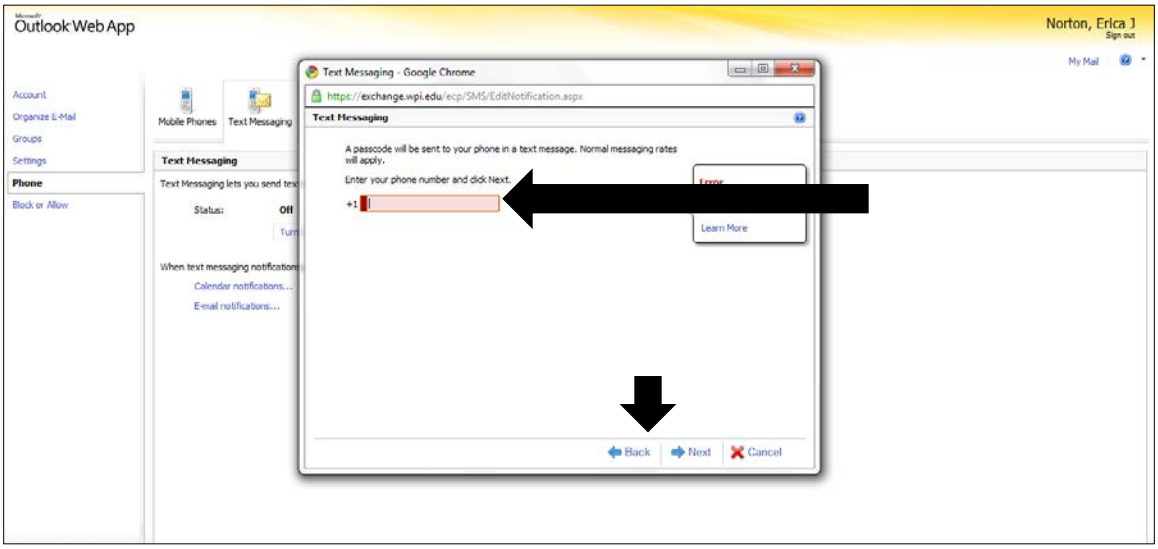


Figure 8

8) A text message that contains a passcode will be sent to the phone number that was inputted. Type the passcode in the space provided. Once this is done click Finish. A confirmation text will then be sent to the mobile device.

The mobile device is now able to receive a notification via text when an email is sent and the settings that will allow a text message to be received when a seat opens on the waitlist can be set through the following steps:

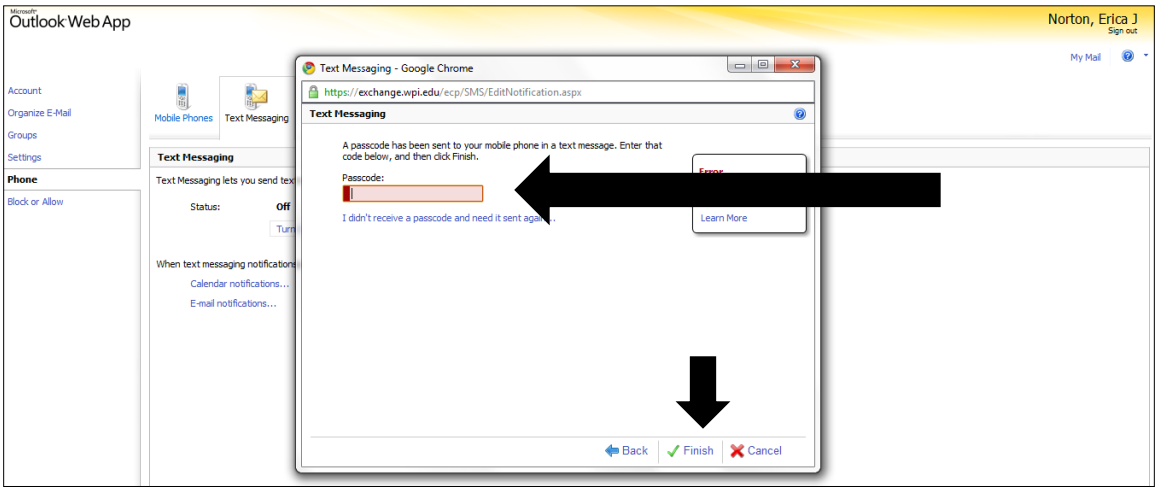


Figure 9

9) On the Text Messaging tab, click Set Up E-mail Notifications….

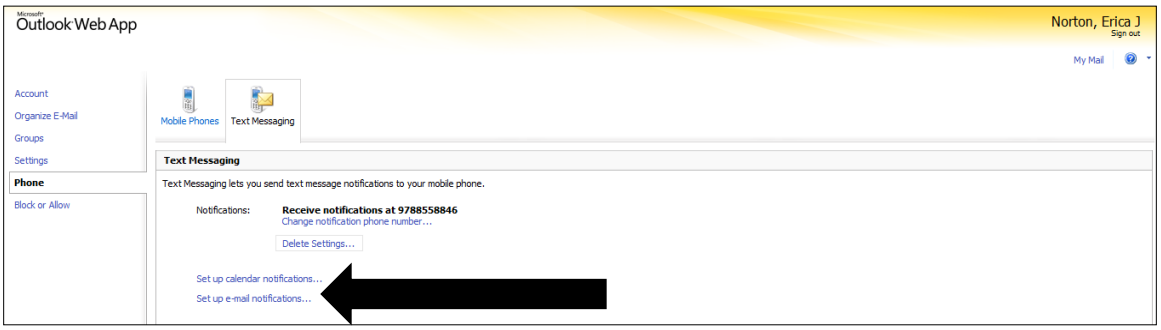


Figure 10

10) A pop up screen will appear and gives the option under what circumstances will a text be sent to the registered mobile device. For this option choose It Was Received From…

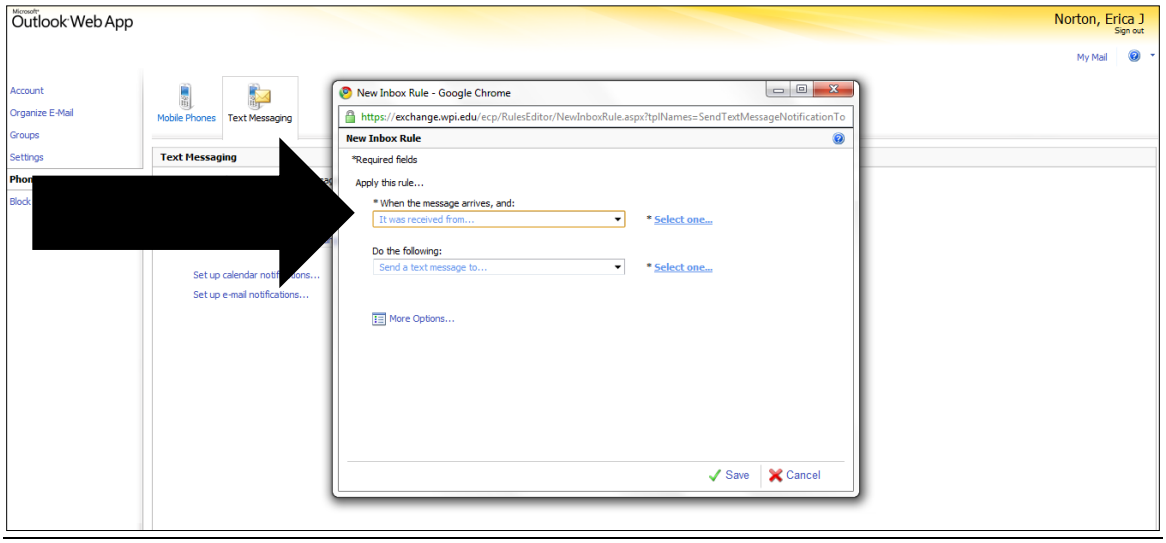


Figure 11

11) Once this is chosen another pop-up screen will appear that contains the list of email addresses that can be chosen from. From this list choose (insert email address here)(The email that sends out notifications about open seats) by clinking the address (single click so that the address is highlighted) and then clicking From which is located at the bottom of the page. Once this is done, click OK.

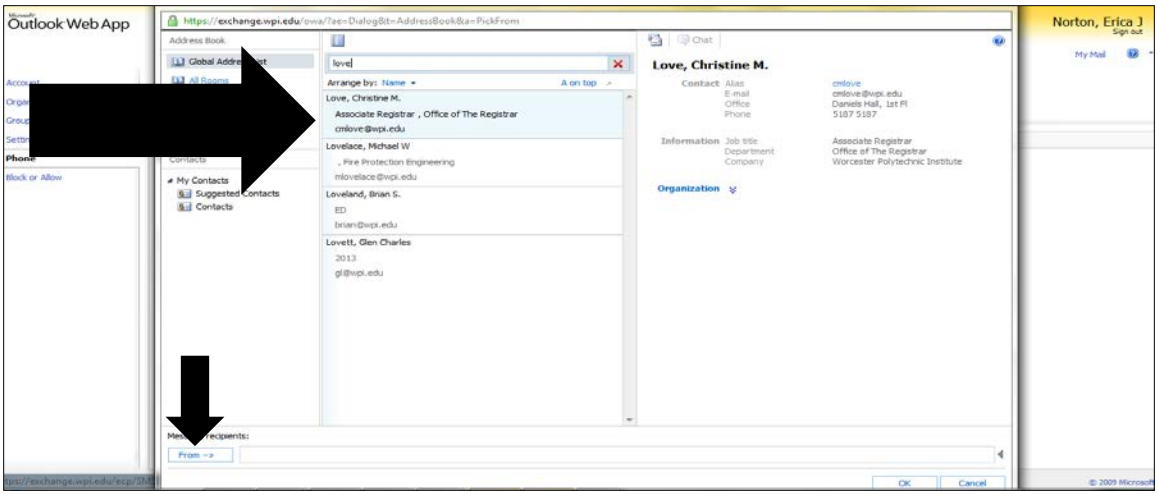


Figure 12

12) Now where is says "Do the Following" choose Send a text message to…. After this click Select one… and the phone number that was registered should appear. Once this is done, click Save.

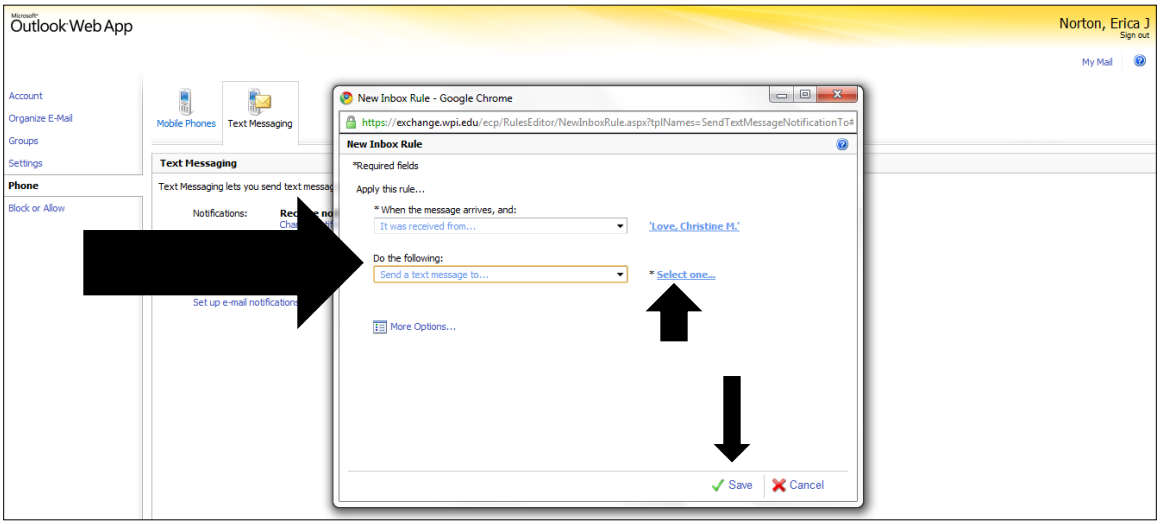


Figure 13

Note: A general warning box will appear telling the user what they just did. Click OK.

Sometimes, a student sees the email from the registrar yet decides not to respond. This can have negative consequences for another student who now must wait an extra 48 hours for the offer; this situation can create a problem where the next student in line might not have taken themselves off of the list had they known about the space, but due to timing, were unaware.

Chapter 3: Approach

On November 15, during the Class of 2014 registration for spring courses, we visited Daniels Hall second floor to both observe and help the students. The choice to observe first year students was based on their inexperience with the system. Upperclassmen have the experience of making their schedule previously, and know how to work with the current system. Their knowledge based on past registration helps them avoid waitlists. First year students do not yet have this knowledge.

We observed and interviewed 58 first-year students. Only one student created more than one schedule in case he did not get in the first choice courses. There were several students, however, who were less prepared and left confused when they were not able to get into their only choices. 29 out of 58 students did not see all the sections offered for large classes simply because they did not realize that they could scroll down in the browser window. Some did not notice that there was more than one section that would fit into their schedule, even when these sections were on the same page. Finally, there were three stubborn students that refused to take morning or late afternoon classes, simply because they did not want to get up early or be in class late in the day. After the students' initial attempt at signing up for classes, 38 of 58 First Year Students were on at least one waitlist.

We met with all of the students who were on a waitlist and provided several suggestions. We suggested that students try to enroll in sections of courses early in the morning (before 11:00am) and in the late afternoon (after 3:00pm). We also informed many students that they could scroll down to find sections of courses that were not yet filled. After providing these two very simple suggestions, 19 of the 38 who were original waitlisted students were moved off of the waitlists. Most of the remaining students were waitlisted for courses that had no available

seats in any sections. In addition, three students refused to move even though there were open spots because the sections offered were in the early morning (before 11:00 AM).

On January 30th, our IQP group returned to Daniels 2 and gathered data from some of the students about their waitlisted classes and related experiences. We had 11 students answer surveys (see Appendix A). The 11 students included 3 ME, 3 ECE, 2 IMGD, 1 CHE and 2 RBE majors. In the survey, we had the students outline their original waitlists and describe what happened between November and the beginning of C term. We also surveyed 23 students who we had not helped with registration in order to be sure if and how their experience was different.

Chapter 4: Results and Analysis

By interviewing first year students who received our help as well as those who did not, we were able to identify the differences between the student experiences and results of the two groups of students' final schedules. We also broke down the survey results by term; this helped to show how the trends for class selections changed during the different time periods of the year.

There are several different terms relating to the process that students go through after getting put on a waitlist.

- "Giving up," which is when the student decided to drop the course and take a different one.
- "Rolling in," this is when the student moved through the waitlist and is offered a seat in the course.
- Register for a new section, which is when a new section of the same course was created and the student chose this option.
- "Moved section," which is when the student switched sections to a different conference or lab for the same course.
- "Add/Drop," which is when the student got into the class they desired by getting the professor to sign an add/drop form from the registrar's office.

For C Term, three of the eleven surveyed students were waitlisted for classes. These three students had four total waitlists between them. The waitlisted classes were three core (or Science, Technology, Engineering, and Math (STEM)) classes and one humanities class. The three core classes consisted two math classes (Linear Algebra and Differential Equations) and

one ES (Statics). The student in the Linear Algebra class used an add/drop slip, the student in the Differential Equations class rolled off the waitlist, and the third student gave up on statics; this resulted in 2/3 of the students getting into their core classes. There was also one waitlist for a humanities class, Creative Writing. This student rolled into the class.

We also analyzed the survey results for C term from the 23 freshman that we did not help during registration. In this group, there were 10 different students in 17 waitlists for STEM courses. Additionally, there were 5 different students on 5 waitlists for humanities. Seven students did not get into at least one class they needed. Some examples of student experiences include but are not limited to:

- Student A was moved through the waitlist to roll into Chemistry 1 but dropped differential equations to take an ECE class.
- Student B rolled into a music class and signed up for PH 110 but dropped calculus-based physics and MA 2071.
- Student C gave up on 2 core classes, ES1310 and ES2001 and took other courses.

In D term, six of the 11 Daniels students were on waitlists. They were on eight waitlisted courses in total—three for core courses and five for humanities courses. For the core courses, all three students got into the courses. Two students rolled into their courses (ECE 2022 and MA 2612), and the third student switched sections to get into CAD. For the humanities courses, only one student got into the course. Three of the five students on humanities or social science waitlists dropped their courses, which were Creative Writing, Elements of Writing, and HU1400. One student rolled into RE 1731. As of January 30, one student was still waiting on an art course that was scheduled to begin on March 14th.

For the 23 students that were not from Daniels 2, 10 of them had waitlists for STEM courses, with a total of 11 courses waitlisted. As of February 2011, seven students were still not enrolled in the core STEM courses they needed for courses that were scheduled to begin in March 2011.

In D term, students took different courses of action to address their waitlists than they did in C term. Twelve students moved through their D term waitlists and got into the sections of the courses they desired, while only seven students did this in C term. By late January and early February, nine students were still on the waitlist for their desired courses. At this time, new sections had not yet been added for D term, so students were not necessarily aware that this might be an opportunity in the near future. Students had given up on five waitlists for D term courses, compared to 12 dropped waitlists for C term courses.

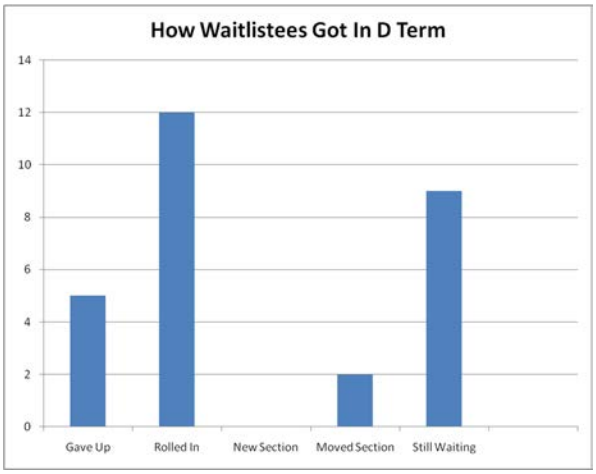


Figure 14: D Term Actions

We also observed how students acted after dropping courses. Of the 11 students we originally observed who dropped their classes; four students were able to get into similar classes in the same department. The other seven students took courses that were in a different area of study than the course they originally selected; this suggests that the area of study the student was interest in was difficult to get into.

Overall, 13 of the 34 students were on a total of 20 waitlists for C term core STEM courses. Additionally, 16 students were on a total of 17 waitlists for core STEM courses offered in D term.

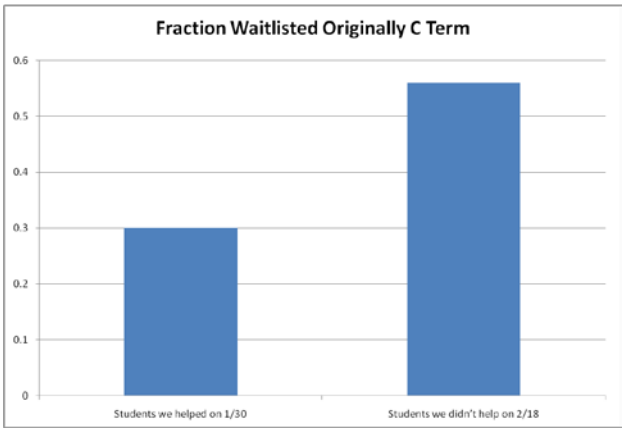


Figure 15: C Term Waitlists

There was a noticeable difference in waitlists between the freshmen that we helped and those that we did not. As shown in Figure 15: C Term Waitlists, 30% of the freshman we helped had waitlists for C term courses, while 55% of the freshman we did not help ended up on waitlists. In D term, about half of the students had waitlists in both categories. Based on this data we can infer that we did help students avoid common waitlist problems, and we saw a few students get off unnecessary waitlists after we walked them through their options. From this, we can gather that this is the reason that the floor of students we helped had less waitlists overall than those we did not help. From the information collected over both terms for the 11 students we surveyed, it can be shown that 6 of the total 13 waitlists were for humanities courses, showing that humanities courses represent a large portion of the waitlist problem.

Another common problem and solution we noticed was that many of the courses with large waitlists ultimately moved to larger classrooms or had new additional sections created to

increase the course capacity. However, several students had already given up on the class and elected to take completely different classes. We believe that this problem stemmed from lack of communication about possible future steps being taken by the administration. Some students are unaware that their core course could gain more seats and therefore may prematurely give up and choose an alternate course. If this happens, the size of the waitlist decreases, however, the registrar now has an inaccurate count on how many more students need or want that course.

Chapter 5: Conclusion

After observing first year students and working with staff, we concluded that first year students need help with registration. The resources currently available are either not enough, or are simply not sought out by students. The current student population focuses more on current problems than preparing for the future, so immediate help is more valuable than trying to prepare students weeks in advance. When students do not receive the help they require they often end up on waitlists unnecessarily, causing more problems for WPI faculty. With a new program focused on helping students during the process much of the current issues would be reduced or resolved.

WPI course registration can be frustrating for students because each class year registers at the same time. This means about 1,000 students can simultaneously register for their courses. Waitlists can add further complications. When students are placed on a waitlist, some choose to find alternative courses to get off of the waitlist and some choose to be placed on several waitlists. At the beginning of each term, if the student is still on a waitlist for a current course, they must go through different processes to be able to get into the course they wanted. This adds extra time that both the student and registrar staff must take in order to solve this problem. The best approach for students to get the courses they need and to stay off waitlists is to have a plan of what to do if their first choice schedule does not work out. Several back-up schedules ensure that the student can get into meaningful classes for their major, even if they are not the student's first choice. Trying to make alternative schedules during registration is very hard because of the hectic nature of the night, and many will simply waitlist instead of looking for a new schedule. If the student has several lists of CRN's, it becomes easier to try again than to waitlist. In our research we saw only 1 student out of 58 with a backup plan. This means emphasis on making alternative schedules or courses should be provided to the students.

Other factors also contribute to schedule issues students develop. The current communication between Bannerweb and the student can be very confusing, especially for new users. In some instances there are symbols that have meanings that must be looked up on another site or elsewhere within the software. Error messages also often do not tell the user what went wrong. Cross-listed courses, which are courses listed under two departments, as well as these vague error messages increase frustration.

Communication between WPI faculty and the student can also be unclear. For example, the e-mail explaining how a student can now register for a course. This e-mail does not explain which course requires the action. Even clear e mails can be a cause for trouble, since many students do not check their e mail frequently. Though the blame is on the students, WPI needs to adapt and connect with the students another way, simply telling students to read their e mail is not sufficient.

Many of the problems students typically encounter during registration can be avoided completely and easily by coming to course registration night prepared with backup schedules. The majority of the remaining problems can be solved immediately during registration by someone with a moderate amount of experience with the system. If a student is on a waitlist, a new form of communication would keep them better informed. Since many of the problems are simple, major changes are not required. Most of the challenge is getting the students to listen. During registration, the time when students have the problems, is the time where they are most likely to seek advice and listen.

Chapter 6: Recommendations

After conducting observations, gathering data, and speaking with students, we made several recommendations to optimize the registration process for first year students. These suggestions would not only reduce their frustration but would help reduce their chance of being placed on a waitlist. Since the majority of students do not make alternate schedules, WPI should invest in software that would assist students with creating multiple schedules. This would allow students to better understand the registration process and have a resource to use in case of being waitlisted for a course.

To help students become more aware of the registration process, a better way of exposing information to them is necessary. One way of doing this is holding an event during re-orientation the day before B term begins in late October to go over how registration works and what to expect. Re- orientation is a newer program that highlights information and resources that were exposed to first year students during their New Student Orientation at the end of August. This program will reduce how much information they are expected to read and will reinforce knowledge about the process. Community advisors and residential advisors should also play a more active role close to the registration period. This is because most first years do not know that they should utilize any resources that are given to them. The Insight team which includes residential, community and faculty advisors to be able to give a student advice, which will help the student, be better prepared.

Works Cited

College Scheduler LLC. (2010). *Student Class Scheduling Software By College Scheduler LLC*. Retrieved April 19, 2011, from College Scheduler: http://collegescheduler.com/

Hawkins, C. A., Lucia, P. N., & Rubio, G. (2008). *The WPI Scheduler Project.* Worcester: Worcester Polytechnic Institute.

Lee-Thorp, K. (1999). *How to Ask Great Questions: Guide Your Group to Discovery with These Proven Techniques.* Colorado Springs, CO: NavPress.

SunGard Higher Education. (2011). Retrieved April 19, 2011, from SunGard Higher Education: http://www.sungardhe.com

Worcester Polytechnic Institute. (2011, May 9). *DESIGNS: First Steps in Creating Your Academic Experience at WPI*. Retrieved May 18, 2011, from Office of Academic Advising: http://www.wpi.edu/Admin/OAA/Designs/

Worcester Polytechnic Institute. (2011, March 28). *First Year Experience*. Retrieved April 19, 2011, from Undergraduate Studies: http://www.wpi.edu/academics/Undergraduate/FirstYear/

Appendix A: Follow Up Survey

Name_____

Student ID #_____

Current Courses for C2011

	Course Number	Course Title	Section Number or Time?	Were you initially waitlisted?	Why were you waitlisted?	Comments
#1						
#2						
#3						
#4						
#5						

Original Courses for C2011

	Course Number	Course Title	Section Number or Time?	Were you initially waitlisted?	Why were you waitlisted?	Comments
#1						
#2						
#3						
#4						
#5						

Please answer the following questions in regard to C TERM

1. Which of the current classes on your schedule did you get into the first time you registered?

_____ _____ _____

2. For which of the current classes on your schedule were you on a waitlist?

_____ _____ _____

3. Are there any classes on your schedule that were added after the initial registration (on April 15)?

_____ _____ _____

4. For each class you were waitlisted for in C term, what did you do?

Course Title/Number

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

Name_____ Student ID #_____

Current Courses for D2011

	Course Number	Course Title	Section Number or Time?	Were you initially waitlisted?	Why were you waitlisted?	Comments
#1						
#2						
#3						
#4						
#5						

Original Courses for D2011

	Course Number	Course Title	Section Number or Time?	Were you initially waitlisted?	Why were you waitlisted?	Comments
#1						
#2						
#3						
#4						
#5						

Please answer the following questions in regard to D TERM

1. Which of the current classes on your schedule did you get into the first time you registered?

_____ _____ _____

2. For which of the current classes on your schedule were you on a waitlist?

_____ _____ _____

3. Are there any classes on your schedule that were added after the initial registration (on April 15)?

_____ _____ _____

4. For each class you were waitlisted for in D term, what did you do?

Course Title/Number

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

_____ Got In ☐ Add/Drop Slip ☐ Dropped ☐ Still on Waitlist ☐

Interviewer: _____ Date: _____

Appendix B: Interviews

Questions with David Galvin

Mr. Galvin took the time to answer some questions via e mail with us regarding the technical aspects of BannerWeb. He was not able to disclose much technical information because of an agreement with the vendor. Our main question was whether BannerWeb had the capacity to send out text messages when a student needed to be notified of their progress on the waitlist. Mr. Galvin told us that currently there is no way to do this in BannerWeb, but the latest release is moving in that direction. He also said that the new system will allow students to claim a seat in BannerWeb without the registrar being involved.

Questions with Chuck Kornik

Chuck Kornik, Administrator of Academic Programs, met with us to discuss classes and BannerWeb. First he gave us an overview of how the system worked, and how the students use it. He described Category I and II classes, how the waitlist rolled, and cross-listed courses. He described how cross listed courses are confusing for students, since it looks like there are available seats. Chuck is able to set limits for each of the courses that are cross listed, as well as for the overall class. He can also let each course float and only put on one limit. Chuck is on board with getting rid of cross-listed class, but thinks that it would be hard to convince the departments to remove them.

Chuck said the only prioritization that currently happens is when a student brings an add drop slip to a professor, and the professor can decide which students get into the class. He did not think it would be fair to implement any sort of prioritization. He even said that doing so would bring about lawsuits. He did think that limiting the number of sections a student could register for in the same class was a good idea, as long as the student was already in one section. He also agreed that students probably do sometimes have a schedule that works without having to be waitlisted, but that they don't know it. He said that the school has looked into some software to help with this issue.

Questions with Heather Jackson

Registrar Heather Jackson took the time to have an interview with us. During the interview one of her main concerns was developing a better way to notify students of their waitlist status. She also agreed that limiting the number of sections a student could register for was a good idea, saying it would remove unnecessary clutter in the system. We asked about a way for professors to be involved with managing their own waitlist. She explained a system that would eliminate the time delay that happens with add drop forms, which sometimes allows a student not in line to get into a class. Professor would have codes they could give out to students, and the student could use the one time use code to get into the class online. She explained that she came from a

school that used Datatel, and that both systems had their issues.

Interview with Christine Love

On Wednesday November 10th Christine Love answered some questions with us. She told us a few things we didn't know, like that 2 days before classes the professors get a copy of the waitlist. She has a program she runs that generates an e mail list to send out to kids that have the ability to claim a seat. Usually the e mail is sent out by Christine. Primetime classes fill up faster, not the lower numbered ones in her experience. She roles the waitlist herself, it is not automatic. She has a system in place so it gets rolled around the same time.

We proposed the code idea to Christine. She said it would help with the massive amount of kids that go into the registrar's office on the first day, but still might be a first come first served system not based on the waitlist. Overall, the biggest concern of her's was that kids leave themselves on waitlists when they no longer need the class.

Interview With Dale Snyder

Friday November 14 we sat down with the Director of Academic Advising, Dale Snyder. She agreed with a lot of the concerns we had regarding the waitlists. She said that she knows for a fact that students waitlist themselves for classes when they have an alternative schedule with the same classes without waitlists. Some of the other problems are students that panic when they get on a waitlist, even though the school often opens up new sections if there are a large number of students on waitlists. Also students will often waitlist themselves into a time conflict, since the system won't alert students of the conflict until the students is in the class.

Another issues comes from the e mail alerts. The e mails do not specify which class a student got into if they are on multiple waitlists, which causes confusion. Dale said that students and parents alike are confused by the current system, and that students already use the WPI scheduler leading her to believe they would use an endorsed scheduler. She also agrees such a tool would more evenly distribute waitlists. Currently she believes that students use whatever method they hear about from their friends to schedule classes.

Interview with Connie Peppes-Aramento

Tuesday Nov 23 director of first year programs Connie Peppes took the time to meet with us in the library. We asked about freshman registration, and she told us the normal issues, such as students on waitlists, hold on accounts and students wanting backup classes were the issues that occurred. She explained the process for opening new sections of a class, and how new sections will only be opened if there is really not enough seats for everyone. Connie explained that when these new sections opened, an e mail announcing the new section is sent to only the kids on

waitlists for other sections. She said that the waitlist problems are stemming from both the fact that students do not know how to think “outside the box” to create their schedule and from shifts in majors.

Connie agreed with a lot of what we suggested to solve the problems that exist today. She said that she knows for a fact that students stay on waitlists when they have another section that would work in their schedule. She said that she has to help a lot of students make schedules, and that this is something that students can easily do themselves. It seems a scheduler would help Connie focus more on her job. We asked about how to train students to use a new scheduler, and she said that a tutorial could be written, as well as having an explanation be part of insight.

Appendix C: Email conversations

Conversation with David Galvin:

----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 7:39 PM
To: Galvin, David W.
Subject: RE: Bannerweb Question

You have to log into bannerweb and register for it.

From: Galvin, David W.
Sent: Monday, November 01, 2010 7:37 PM
To: DeMello, Craig Alan
Subject: RE: Bannerweb Question

Currently, if you are notified of an available seat, what do you do?

-----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 7:35 PM
To: Galvin, David W.
Subject: RE: Bannerweb Question

How is this different that what was in place before? Ii dont think I understand.

From: Galvin, David W.
Sent: Monday, November 01, 2010 7:31 PM
To: DeMello, Craig Alan
Subject: RE: Bannerweb Question

No, to allow you to 'claim' the seat by logging into Banner student web. I could be wrong, that's the 5% uncertainty.

-----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 7:28 PM
To: Galvin, David W.
Subject: RE: Bannerweb Question

You mean if they chose the student will automatically be added if they move up the waitlist?

From: Galvin, David W.
Sent: Monday, November 01, 2010 7:23 PM
To: DeMello, Craig Alan
Subject: RE: Bannerweb Question

I believe, 95% certainty, the option to allow the student to 'claim' a seat on the Student Web was part of an upgrade installed recently.

-----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 7:17 PM
To: Galvin, David W.
Subject: RE: Bannerweb Question

I mean when someone has progressed through the waitllist and has the option to register for the class.

Craig

From: Galvin, David W.
Sent: Monday, November 01, 2010 7:12 PM
To: DeMello, Craig Alan
Subject: RE: Bannerweb Question

Currently, contact is only via email. Functionality using text messaging does not exist in the product as delivered from our vendor. Based upon a conversation with our sales rep this morning, they are moving in that direction but have not established a timeline for deliverables.
Would you clarify what is meant by 'moved up'?

-----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 7:02 PM
To: Galvin, David W.
Subject: RE: Bannerweb Question

Our main question is whether the bannerweb system had any provisions for contacting someone who was on a waitlist and moved up and can register for the class by text message in addition to e mail. If it doesn't, is there any way to implement such a feature.

Thanks,
Craig DeMello

From: Galvin, David W.
Sent: Monday, November 01, 2010 6:58 PM
To: DeMello, Craig Alan
Cc: Norton, Erica J; Brown, Victoria J
Subject: RE: Bannerweb Question

Hi,
It would be best if your group could forward your questions to me in an email message. This will enable me to bring in other resources if the questions/answers exceed my knowledge. Just so you are aware, there are certain details of the inner workings we are not

allowed to divulge due to security and proprietary agreements with our vendor.

Thanks,
David

-----Original Message-----
From: DeMello, Craig Alan
Sent: Monday, November 01, 2010 6:07 PM
To: Galvin, David W.
Cc: Norton, Erica J; Brown, Victoria J
Subject: Bannerweb Question

Hello Mr. Galvin,

I am part of an IQP group advised by Dean Heinricher researching certain aspects of the Bannerweb system. We had a couple questions about the inner workings of the system and wondered if you would be able to assist us, or point us in the direction of someone who could? If you could assist us would you be able to meet with our group?

Thanks,
Craig DeMello

Appendix D: Interview Questions

Christine Love Interview Questions:

- What does it mean to "freeze" the waitlist?
- What does it mean to "claim" a class?
- What is the address that sends out notifications to student in order to claim a class?
- Do you notice certain sections of large classes fill up faster?
- Do you feel that a scheduler would help dissuade some of the focus on certain sections?
- How often do you roll the lists/is it automatic?
- What is the capacity of each of the servers (approximately)?
- If you change the server number on the bannerweb address, will it affect your course registration?
- Does remote desktop entrance gain faster registration?
- What happens behind the scenes when a student moves up a waitlist and can join a class? What are the steps?
- Do Mass Academy kids get to jump the waitlists? (We are aware that they get registration a day early, but if they are on a waitlist, do they get to skip to the front?)
- Would a code system for registering for a full class (eliminating the add/drop paper trail) help the process go more smoothly?
- Are students who keep themselves on waitlists once the found a schedule for themselves a big problem?

Dale Snyder Interview Questions

- Do you think that when students make their schedules they don't see all the possibilities, and consequently end up on waitlists unnecessarily?
- What are some of the problems students bring to you regarding waitlists?
- What problems to students bring to you that arise due to missed e mail?
- Have students ever indicated an interest in a WPI endorsed scheduler?
- Do you think such a tool would get used by students, and have an effect on current waitlists?
- Overall, how do you think current students go about making schedules? Are they happy with the current process?

Connie Peppes Interview Questions:

- What are some of the after effects some of the freshmen are showing after course registration?
- Do you feel that parents complaining helps/worsens/has no effect on the predicament of whether or not to add additional sections?
- What is the procedure for opening new sections of particular courses such as physics where there are more students waitlisted than spaces open?
- Why do freshman only make and depend on one schedule?
- Do freshman sometimes have a schedule that would work, but instead just stay on a waitlist (either knowingly or unknowingly)?

- What corrective steps have been taken towards the situation where students were not allowed to register/waitlist for multiple sections due to “time conflicts?”
- If students are allowed to register for sections of the same class that have a time conflict, does the system disregard time conflicts with other classes?
- Do you feel as though the waitlist issue stems from over enrollment in the freshmen class, shifts in major selection, or another reason?
- Do you have any advice for a freshman waitlisted for multiple courses?
- Do you feel that a scheduler would ease some of the hassle freshmen have in learning how to enroll in their classes?
- Would students take advantage of a WPI scheduler?
- Would teaching students to use such a tool be an issue?
- Do you have any recommendations for upperclassmen registration in the spring based off of issues with upgrades that freshmen encountered? (e.g., preferences being re-set with the upgrade)

Chuck Kornik Interview Questions

- Is there anything you would change regarding waitlist or Banner in general?
- Are there any issues you have dealing with waitlists?
- What prioritizations features, if any, are currently implemented?
- Have prioritization features ever been in place?
- What effect do you think prioritizing the waitlist by major and class year would have?
- Are there certain classes or disciplines that usually have waitlists?
- Would limiting the number of sections a student can register for be, in your opinion, a good way to remove some unnecessarily waitlisted student?
- When times for classes are scheduled, are they set up in a way that allows for classes commonly taken concurrently to fit together?
- Do you think some of the students on waitlist might have an alternative schedule that will work for them, but just don’t know it?

Appendix E: Scheduler Options

This is a brief listing of the software tools available to help students explore and create course schedules.

Banner Scheduler
http://www.sungardhe.com/products/category.aspx?id=754&LangType=1033
Banner Developed, works with Banner
estimated cost 50k,
Managed by the school, since it is a Banner system it is easy to install and maintain
No shopping cart functionality
automatically registers people

College Scheduler LLC
http://collegescheduler.com/
Works with Banner, Datatel
We would need to get an estimate
Managed by the company offsite, no work for WPI IT
California State, Grinnel College, ect are cleints

Mimosa Software
http://www.mimosasoftware.com/prices.html
Used in many countries
approx 5k
General scheduling software
May require work to get information from Banner

In order to best solve the current issues with waitlists and student course registration, it is desired to purchase a scheduler for use by the student population. To make the best use of WPI's money, and since purchasing such a scheduler is a big commitment, it is necessary to make sure that the scheduler that would best suite WPI's needs is the one that is purchased. When looking into the options for a scheduling tool, several options came up. Currently three of the most widely used schedulers are CollegeScheduler LLc, Sungard Banner Scheduler and schedulers developed by Mimosa Software.

The first option is a scheduling tool developed by Banner, the system WPI already has. This option is comparatively expensive, costing about $50,000. The benefit of this option is that since it is a Banner add on it is guaranteed to work with Banner without any complications. The actual software is not as helpful as some of the other options, and it does not have a shopping cart

option. You can, however, add the classes right from the program, since it is Banner. This option does not have a great cost to benefit ration.

The second option is a software package developed by a private company called College Scheduler LLC. This scheduler has an initial cost of 10k and an upkeep cost of 2.5k a year. This is a web based application hosted at College Scheduler, and does not require IT upkeep by WPI. Many other colleges use this system. The program only requires a flat file from Banner, therefore will work with the current system easily. The application can be updated however often you set it to, and has options to block out chunks of time to work with students schedules.

Mimosa Software also offers customized schedule solutions to companies and colleges globally. This scheduler has an estimated cost of 5k, but may cost more to customize for use by WPI. This scheduler is more general that the other two, because it was developed for a wide range of tasks. This tool may require a good amount of IT support to work with Banner.

Without getting complete demos from all companies, College Scheduler looks like the best option for the WPI community. The software will interact well with Banner, and is relatively cheap. The tool uses a shopping cart system, you simply add the classes you want, find a schedule and checkout. The fact that WPI would have to do very little maintenance on it is a big benefit.

Appendix F: How to Ask Great Questions

Since our project started, the ending goal had changed many times. A lot of our research became irrelevant because of this. The following appendix is an example. It describes how to ask the right questions, which we thought we would use to conduct focus groups. However, we did not use focus groups for our project, so it no longer relevant.

How to ask great questions summary:

There is a no one single way to organize a focus group, nor is there a particular specific formula for guiding others to discovery, so the best we can do is to learn as much as we can about styles that work and have been highly effective in the past. After reading *How to Ask Great Questions* by Karen Lee Thorp, the following are several tactics that we decided to pull out of the text and try to utilize their effectiveness for our own use.

When asking questions, there is no more effective tactic than a well times, well-phrased question. The best questions are simple, clear, and thought provoking. Research tells us that people will remember a lot more of what they say than what they hear, so provoking them to think, and answer allows for them to remember more effectively. Also, keeping the discussion groups small so that every person can actively participate enhances this opportunity to contribute, analyze, and learn.

Discussions are more effective when participants feel as though it is exactly that – a discussion, not a test. Asking questions such as "What do you think?" rather than "What are the technical specs of each scheduler?" feels more personal rather than quizical. Tests cause for adrenaline, which actually hinders creative thinking, and in focus groups, you're supposed to be fostering creative ideas rather than putting up roadblocks for them. These conversations should also take place with a feeling of mutual respect amongst participants to encourage comfort and freethinking.

Conversations usually also do not allow for manipulation of words in contexts. Leave the word manipulation to the lawyers. In focus group discussions, be sure to avoid starting sentences with "I think" or asking questions that insinuate a generalization. Leading the conversation won't help you get any information you didn't already have. By giving either-or questions you're limiting your options for replies, and all of the above mentioned limit the extent of creativity your group can reach because they have now without intention, limited their thought processes to only those that you have mentioned.

The best way to get a clear and concise answer is to ask a simple and concise question. Technical terms can leave people in the dust, and asking several questions one right after another with no time in the middle can leave people lost very quickly. On the opposite side of things, being vague is also very limiting to your goal. If your group is left wondering what *kind* of response you're looking for, you're doing something wrong. Needing to specify might be

necessary, but you shouldn't be put in that situation if you're careful about focusing in on precisely what you want to know.

Sometimes questions warrant a simple yes or no, and the answerer may avoid explaining their thoughts outside of this answer. In order to avoid blunt answers, make sure to leave questions open-ended. Fact-finding questions can become very boring when they only require one or two word answers, and will start to create a loss of interest because participants may feel as though you don't *actually* want to know what they are thinking.

In order to encourage conversations and discussions to dive below the surface, you may need to help people get conversations going. In a healthy discussion, people talk to each other rather than conversing through the discussion leader. In an unhealthy group, every silent pause warrants the group to look back at the leader for the next conversational prompt.

When in discussion, be aware that some people are more in tune with specific details, while others are more oriented towards the big picture. You will need both thought processes in order to make sure you don't overlook crucial aspects in either regard. While encouraging both analytics, also be sure to relate the two together or else you will have two very different conversations going on, and possibly some clashing of personalities within the group because the persons involved may not realize this difference in views and what is important to them may not appear to be very important to others.

When all is said and done, all group members should feel as though they have contributed to the topic at hand, which will allow for a consensus that the group is comfortable with. If questions went unanswered, or a group member felt as though their opinion was not heard or taken into account, there may very well be some unsettled discussion members who resent others. You want to avoid leaving the discussion with disgruntled members in order to have the best final result and most well thought out plan or final product.

Groups tend to be much more effective when there are pre-existing relationships and trust exists. By first taking the time to invest in building relationships, you can open doors to conversations that require participants to leave themselves vulnerable to the opinions of their group mates. Vulnerability is hard for many to face, and as was aforementioned, requires trust and cooperation. The thoughts and ideas that every person in the discussion *could* bring won't be there if they don't feel as though it is safe to speak their mind without judgment.

A sharing question at the beginning of a meeting is a good way to allow group members time to vent their own personal thoughts and feelings giving them more attachment to the session at hand. You can set the bar for sharing by going first and demonstrating an ideal time or length as well as the intensity level of personal depth and vulnerability. Leading out with a story about how frustrating course registration was, or how many courses you were waitlisted for, or how many hours you spent working on your schedule only to have time conflicts would be a great start.

In allowing everyone that short span of time to talk about themselves, or their connection to the topic at hand, they feel heard and appreciated. If you don't allow a little time for sharing, some group members may feel saddened by their inability to share their own experiences, while others may burst out with their own speeches for attention or start conflicts and try to counteract any productivity or progress the group is trying to make. Be sure to think carefully about the level of intensity that is appropriate for the group at hand.

How you answer questions also sets a tone. By leading out an answer, you can have a joke on hand to get a happy and fun mood going, or answer very serious and factual if you want to keep a strict business tone. Setting the tone at the very beginning of the meeting will help others to match your tone and be more productive rather than allowing for mixed signals and confusion. If your group leader walks into the room and appears stressed and says in a harsh tone what you're going be discussing, people are going to respond in a very serious and scared way. If your group leader starts off with a joke, people will be a little more excited to enjoy their time, and will want to get down to business because it isn't such a bad place to be. Course registration can be very stressful, especially if you are waitlisted for multiple courses, so joking about how you got into a section closer to your residence hall during snowy months instead and laughing at your friends to had to trudge across campus might lighten the mood.

Make sure when you are designing questions for sharing to cater them to everyone. Sometimes we forget that others might have had vastly different living situations or styles, and we must be conscious of this. Not everyone hates 8 AM's, so asking a question such as "Why won't people on waitlists suck it up and take open seats in 8 AM's?" might offend those who do prefer those timeslots. When asking questions, it would be safer to topics you *know* have commonality throughout the whole group, such as "Did you get into all the courses you wanted?".

When asking questions and directing your conversation, it's good to be aware of different approaches to problems or projects. Some people are task-oriented while others focus on relationships. Task-oriented people might want to lean more towards committees and delegation while relationship oriented people might want to have more sharing time and try to relate more to others before getting to work.

Overall, the important things to know, are to get to know your group, and they will be more willing to help you. By providing that open door and establishing that relationship, conflict should not be a problem.

Observation can be very boring for many people, so getting what you want to know out of them as soon as you can is your best bet. When formulating your questions be sure to keep in mind precisely what you want to know, and try to direct your questions to encompass as much of that as possible in the least number of questions. A few key questions that draw out precisely what you want to know or observe are clutch.

When receiving observations, you should have two categories of information on hand. Category 1 would be information you find helpful for the group to pull out of the activity they partake in. Category 2 is the information you supply to your participants before hand that might help prompt them to find useful information. For our particular project we suggest possibly the topics of category one being preferences for user interfaces and compatibility with category two being CCC compatibility reports.

When drawing out factual information that would be helpful, you should make sure that the details of the questions you are asking bring attention to significant or worthy information. Factual questions help people focus on what is important and really pull it apart rather than scanning over it. Once you have withdrawn pertinent information, you may then switch gears to begin considering the meaning and relevance.

Throughout this fact hunt, it is important to keep in mind that you're really trying to decipher what it all means, and what the final recommendation should be. Asking too many "Why"s or "How"s lead the group out of their focus and into unnecessary tangents that don't help. Those types of questions deter the group into analysis rather than awareness, which can create an overload of information about too many different topics and you can completely miss the mark of your original intention. Stick to the facts, and make sure to direct the group in the direction of the precise pre-decided decision you want to make.

When making decisions, we can be heavily influenced by our emotional side. Frustration may make us choose a particular scheduler in haste, and that doesn't mean it's going to be a good choice for our campus. Asking people how they feel about registration can help us understand what causes the emotional distress, so that we can look for a scheduler that relieves as many of the causes as we can. The book suggests a couple different questions using both logical and emotional relevance to make the members of the focus group separate their thoughts based on both response levels. Some of these questions are:

- In your experience, how does course registration make you feel?
- What are some worries you tend to have towards registration and your schedule?
- On a scale of 0 to 10, what level of worry does registration and scheduling set on you?
- What reasons for not worrying would a scheduler give you?
- If you were playing devil's advocate, how would you defend your anxieties against a scheduler?
- How would your life/schedule/stress levels be different with a scheduler?

When listening to responses, people often respond better when you are empathetic towards them, trying to put yourself in their shoes. Mayb you have never been waitlisted for a

course, but trying to imagine yourself as a freshmen who has no idea what is going to happen, being on 5 waitlists out of the 6 classes you tried to register for – it gets scary!

When asking empathetic questions, you have to be careful how you word them because they can allow for either vastly wild answers, or a narrow range if you give options to the answer. Be sure to narrow the options but not in an either-or type of way.

When asking multiple-choice questions that you want an answer of conclusion, make sure to give three or four options, but don't allow "none of the above" as an answer. In allowing group members to have the option of none, they don't feel pressured to look into it within each scheduler option, and may just use "none" as a scapegoat for doing the research. In choosing three different scheduler companies to present, we open to door to multiple options where there shouldn't be a situation where none of them are what we're looking for.

When sorting through responses, it's important that facilitators know the difference between feelings versus opinions. Feelings integrate emotions, and while many students are frustrated by course registration, an opinion of what is most effective and a feeling of less stress due to ease of use are both extremely valuable in different ways.

Utilize emotions that relate to the topic at hand to find which option makes the user most at ease. "How were you feeling after course registration?" "Would you have felt differently if there had been a scheduler to simply generate a new schedule for you in seconds?" "What about each scheduler would make your life easier?" (<also an opinion question)

When your group tries to finalize a decision, they may find that their logical side (opinion) is pointing them one way, but if their feeling are telling them something else, they could completely change their choice. Discussing these feelings is extremely important so that they can analyze if they're true concerns, or just a thought in the back of their mind.

Once you as the facilitator throw a question out to the group for discussion, be sure to have follow up questions ready that are relevant so as to keep a flow. It is interruptive to the thought process to bounce around many drastically different topics. Staying on topic and elaborating on your question helps others to think about things more in-depth.

When incorporating others' transitions, it's not recommended to respond with "why" or "why not" because that can put them on the defensive and put and awkward halt to the conversation. This can also lead to the person who made the statement to feel stupid or pointed out. Instead, use this opportunity to personalize the conversation by allowing everyone else to contribute his or her opinions on the general topic.

These discussions should have a constant flow because they should look like the image presented in Figure 16,

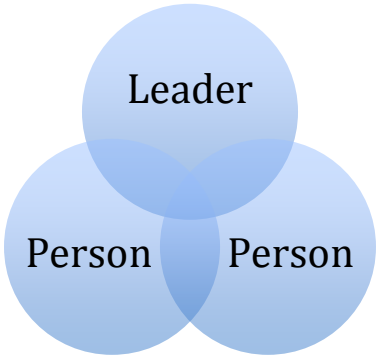


Figure 16

with all people involved having overlap and interaction instead of the image presented in Figure 17,

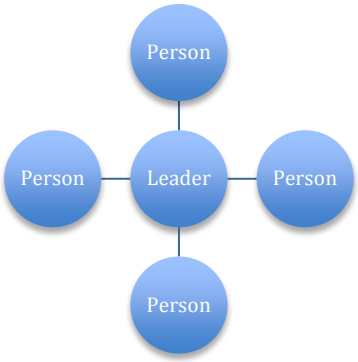


Figure 17

where the group consistently refers back to the leader for guidance and what to say next. The leader shouldn't always have to prompt the conversation. They should be there solely to redirect when getting off topic or needing to reach specific information aspects. Using the phrase, "Anybody else?" opens up this interactive possibility much more than just having people raise hands and be called on. A conversation is the goal rather than a quizzical back and forth dialogues.

In order to keep the most people on-task as possible, it is recommended to have group members paraphrase and summarize what has been discussed or decided thus far at various points throughout. This also allows opportunity for clarifiers if necessary, and for those who

may have missed a detail to catch up, or for others to give them that information. Keeping everyone on the same page throughout will save many headaches when it comes decision time.

The most important thing for a leader to know how to do, is listen. Without the leader listening, they cannot direct the conversation, because they won't understand what is really going on. Without listening, we won't ever solve any of our problems or get any answers, and that would defeat the whole purpose of gathering these people together.

Effective problem solving uses a couple key steps:

- Define the problem (this took us most of B term) – Bannerweb waitlists and scheduling
- Identifying possible courses of action – 3 different scheduler options
- Weighing the pros and cons of each course of action – focus groups
- Arriving at agreement over which option will best get to our goals – Which scheduler will reduce the most registration headaches and need the least tech support from the CCC?

If you skip any single step, you have the potential to completely ruin the whole process and come to an ineffective solution, or one that doesn't solve any issues.

Discussions should begin with the facilitator stating the problem at hand as simply as possible and leaving the rest open to the group. Avoid the whole "that's how it's always been done" because not only is it limiting, but destructive to the creativity level of the group since they're now thinking in a way of avoidance rather than imagining anything as possible. The best way to get a good idea is to start with a lot of ideas because there will always be bad ones and a few good ones, and the good ones might not have been thought up if one of the bad ones hadn't connected someone's thought process to it.

When it finally comes down to decision time, there are several different tactics for making the final selection. When left to experts or leaders, decisions tend to be finished much quicker, however they may not be looking at the whole picture as being in a group discussion would require. Also, a leader making a decision without the rest of the group having input might leave the others resentful of not being included in the decision.

Majority vote is most common in situations of split choice. This allows the largest percent to carry the team. In order for this method to be effective, be sure that everyone has ample and even time to disclose their thoughts on the topic before casting the vote.